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THE
PSYCHOLOGICAL BULLETIN

INTELLIGENCE TESTS

BY RUDOLF PINTNER
Teachers College, Columbia University

General. This summary covers the year 1930, together with some earlier references which have been overlooked in previous annual summaries. Hildreth's (77) book is devoted very largely to the problem of intelligence testing in school. She discusses the tests available, the administration of individual and group tests and the interpretation of test results. Madsen (106) covers educational measurement in general in the elementary school and devotes two chapters to intelligence testing. Odell (123) covers the same ground for the high school and describes seven group intelligence tests suitable for high school work. Brief treatments of the general problem of intelligence testing are contained in the books of Moss (118) and Inskeep (84). In a work-book for the teaching of measurement in general, Park (125) includes good exercises and questions in relation to intelligence testing. Pintner (131) gives the usual annual summary in this journal with a bibliography of 180 titles.

Dunlap (52) discusses the meaning and value of intelligence testing, criticizing many of the conclusions that have been arrived at by some writers. Carmichael (27) discusses the relationship between the psychology of learning and the psychology of testing, and suggests that tests could be used more in teaching as a starting point for future learning. Many different problems are taken up in the mimeographed report of the conference on individual differences (Anon., 4). By means of a questionnaire McClure (109) investigates the present status of psychological testing in large city public school systems. He finds that 21 out of 86 reported separate psychology departments. He lists the various uses to which the tests have been put.

The Meaning of Intelligence. A general discussion of the mean-

ing of intelligence is contained in the book by Filter and Held (54). They stress the importance of environment in conditioning the individual and hence in determining his intelligence. Laycock (97) criticizes severely the definition of intelligence as "adaptability to new situations," and after much experimental work comes to the conclusion that "the psychological processes involved in adaptability to new situations are eductive, reproductive and explorative." Hamilton (69) presents an excellent discussion of the general assumptions underlying mental testing. Meili (113) divides general intelligence into four kinds. He then constructs tests to measure these kinds and by use of Kelley's method arrives at six group factors. These factors are points of view from which to view the "act of intelligence," but this in itself is always unique. The varying amounts of the different kinds of intelligence possessed by any individual can be represented on a diagram and this total picture gives the form of intelligence.

Relation of Intelligence to Other Factors. Strang (152) finds that social intelligence measured by the George Washington Social Intelligence Test correlates .44 with general intelligence for 311 graduate students, and similarly Broom (20) finds a correlation of .58 with the Thorndike Intelligence Test for 646 college freshmen. A correlation of +.48 between M.A. and social intelligence is reported by Scudder and Raubenheimer (141). In many different tests McFarland (111) finds a general factor of speed and this correlates high with ability on the tests.

The relationship between intelligence and physique is thoroughly examined in the notable contribution by Paterson (126). This book brings together and evaluates all previous work in this field. He finds a low positive correlation between intelligence and height, weight, head measurements, anatomical age, and morphologic index. There is no correlation with pubescence and dental development. No measurable influence on intellect is caused by malnutrition, diseased tonsils, adenoids, defective teeth or hookworm. Mental development continues independently of physical factors and diseases, except those diseases which directly attack the nervous system. The book is also valuable for its critique of the methodology of investigation of the relationship between intelligence and physical factors. A shorter account of these same findings is given by Paterson (127) in another report. Stoke (150) reports correlations between I.Q. and height +.20; and weight +.25; and anatomic index +.09. Cattell (32) reports a thorough study of dentition and intelligence. She finds that

these two factors develop independently when chronological age is kept constant. The correlation by age groups ranges from +.05 to +.12. For 500 children from five to twelve, the correlation with C.A. constant is +.11. Similarly she finds small positive correlations between M.A. and anthropometric measures, and M.A. and anatomic index when C.A. is held constant. Abt et al.(1) from a study of the records of 1,000 white children at the Institute for Juvenile Research in Chicago find correlations of —.41 for boys and —.39 for girls between I.Q. and age of talking, and —.36 for boys and —.37 for girls for age of walking. The average I.Q. of these cases is about 81. Blonsky (14) measures the alkalinity of the saliva. For twelve pairs equated for age and sex, he finds that girls with high alkalinity have an I.Q. of 82.1 as contrasted with 73.7 for low alkalinity, and for boys the average I.Q.s are 90.0 and 74.2 respectively. High alkalinity goes with high I.Q.

Three reports deal with the relationship between intelligence and reflex conduction rates. Travis and Young (159), working with university students and children find no correlation, thus reversing the previous findings of the senior author who reported a high positive correlation. Travis and Dorsey (158) find no differences in the reflex times of feebleminded and superior children having an average I.Q. of 119. Whitehorn et al.(168) working with 13 feebleminded and 13 normal subjects find a correlation of +.37 between M.A. and speed of the knee jerk reflex, but this drops to +.15 when stature is held constant.

With reference to motor ability, Seashore (142) finds that the separate tests correlate from +.23 to —.33, while the whole battery correlates —.14 with intelligence among 50 students. Reaction time correlates very low with the Thorndike intelligence test for 253 students, according to Livesay and Louttit (101). The correlations do not differentiate the four racial groups into which the students are divided.

The Minnesota Mechanical Ability Tests devised by Paterson and Elliot (128) correlate only +.13 with intelligence and the authors conclude that mechanical ability is a unique trait. Crockett's (43) measure of manual ability correlates +.14 with intelligence for 87 cases. Scudder and Raubenheimer (141) find correlations between M.A. and the McQuarrie Test of +.05 and the O'Rourke Mechanical Test of +.26.

Various correlations between intelligence and miscellaneous tests have been reported. Intelligence and copying geometrical figures

correlates +.18 for 180 cases in Grades IV to VI, according to Bousfield (17). Intelligence and ability to solve the Decroly puzzle box correlates +.52 for 183 backward children according to Rosenthal-Weiss and Rosenthal (138). The median of nine correlations between mirror-drawing ability and intelligence is +.01 for various groups of subjects according to Clinton (37). The correlation between the Meier-Seashore Art Judgment Test and intelligence ranges from +.28 to —.14 for six groups of high school and university students according to Meier and Seashore (112). Spence and Townsend (144) find that ten students scoring high on the Thurstone Intelligence Test do much better on the finger maze than ten students scoring low in intelligence. The new type examination correlates +.52 with Army Alpha scores, the old essay type examination only +.28, for 102 students in educational psychology reported by Corey (40).

The relationship between intelligence and birth order in the family is investigated by Steckel (146) on 6,790 cases. There is no difference between first, second, third, etc., when no allowance is made for poorer intelligence of larger families. If, however, siblings only are compared, there is a decided rise in mean intelligence from first up to eighth born. Blonsky (15) finds a decided relationship between I.Q. and month of birth. Children born in the spring months have higher I.Q.s. This is due to the better air, sunshine and food obtained by the infant during the spring and summer months. Sutherland (153) continues his studies of the relationship between I.Q. and size of family. He compares fatherless children with non-fatherless of the same age, sex and number of siblings. The I.Q.s decrease with size of family for both groups, but the correlation for the fatherless groups is lower (—.19) than the correlations for the controls (—.23 and —.26), because the natural size of the family has been limited by the death of the father.

Several reports deal with the relationship between personality, character, emotional factors and intelligence. Hartshorne, May and Shuttleworth (71) find positive correlations between intelligence and honesty, foresight and total character integration, although such correlations are in general not high. Broom (21) finds no correlation between intelligence and scores on the Allport A–S Test for 200 college students. Intelligence and temperament as measured by the Downey Test correlates +.21 for about 25 boys, according to Oates (122). Contrasting the extreme cases, *i.e.*, those deviating by more than one sigma, on the Woodworth-Cady questionnaire,

Keys and Whiteside (**91**) find that the emotional are 18 points lower in I.Q. and two years lower in M.A. and E.A. Similarly Hirsch (**80**) finds that the more intelligent show less emotional instability as measured by the Woodworth-Mathews questionnaire. The correlations with intelligence are —.25 for boys, and —.14 for girls. Weber (**165**) constructs a scale to measure emotional age and finds a correlation between emotional age and M.A. of +.42 for 231 cases in grades IV to VII. Olson (**124**) reports correlations between intelligence and ratings on his rating scale for problem tendencies. The average of 12 correlations for separate age groups is —.27. Preschool children are scored for various traits by Goodenough (**64**) and these scores are correlated with M.A. The highest correlation is +.7 for sociability and the r's go down to —.3 for compliance. Rodgers (**136**) measures self-appraisal by having students mark the items of an intelligence test as to whether they think they know their answer is correct or not. Highest mental scores show greatest self-appraisal.

Growth and Constancy of Growth. Studying the results of six semi-annual tests of the same 183 children, Jordan (**85**) finds the growth curves for ages eight to fourteen to be straight up to about year ten or eleven and then to show negative acceleration, which he attributes to the poverty of their environment. He finds no tendency for the high and low groups to diverge. Keen (**89**) finds a curvilinear growth curve culminating about age nineteen. Williams (**172**) applies the Thurstone method of scaling to data on the Goodenough Drawing Tests and finds a curve showing definite negative acceleration. Rogers (**137**) finds gains in retests on the Thorndike Intelligence Test given to college students over a period of three years and argues for a growth of intelligence. Oates (**121**) studies the increase in score on various tests for boys, ages eleven to eighteen, and finds that motor abilities mature relatively early whereas intelligence matures later. He analyzes the activities involved in intelligence tests from the point of view of the functional maturity of the processes underlying them. Sorensen (**143**) finds a negative correlation between age and learning ability for a group of adults who had not studied for a long time, but no such negative correlation for two other groups of adults who had continued learning. Hence, he concludes, there is no real decline in ability to learn due to age. There is merely a rustiness due to lack of practice. Conrad (**39**) analyzes the sub-tests of Army Alpha with adults, and finds that scores decline as age increases on all except the information test. Here scores increase with age. He suggests an information test for testing adult

intelligence, where a rise in score would indicate a decline in intelligence.

Foran (55) summarizes the results of re-tests of the Stanford-Binet from 1926 to 1929. The re-test correlation varies from .80 to .95, and the P.E. is about 5 I.Q. points. Hirsch (80) gives results for about 300 children having about six tests each over a period of five years. The average yearly change in I.Q. is 5.3. The average of six re-test correlations is .863. Brown (24) reports results for 707 problem children with two or more Binet examinations for each. The average amount of change in I.Q. points is 5.79 and the correlation of first with second test is .88. He also shows that the time interval between re-tests up to four years does not influence the correlation, and that the I.Q.s of the feebleminded (those below I.Q. 60) are least likely to change. Baldwin et al. (9) report re-test coefficients of .75 for 55 boys and .84 for 48 girls in one-room rural schools tested one year apart; and also coefficients of .90 for 67 boys and .80 for 94 girls in consolidated schools. Cuff (45) finds a re-test correlation of .98 for 144 children in Grade I on the Herring-Binet after an interval of twenty-four hours. The re-test coefficients for superior children after six years range from .77 to .81, according to Terman (156). Hetzer and Jenschke (76) report on re-tests of 24 infants after three to fourteen months. When grouped in three groups, advanced, normal and retarded, only two cases change their grouping in the second test. Garrison (60) repeats the Yerkes Point Scale on 73 college students after an interval of ten years. His correlations between the 1916 and 1926 scores are .58 for 32 men and .76 for 41 women, thus showing fairly consistent results for a highly selected group over a long interval of time. Chipman (35) analyzes the re-tests of 1,751 cases in a feebleminded institution. No change greater than plus or minus five points is shown by 79 per cent, a loss of five or more points by 12 per cent, a gain of five or more points by 9 per cent. He also shows that in the calculation of I.Q.s the use of 14 instead of 16 causes a much greater change in I.Q. from test to re-test. Wheeler (167) shows a decreasing gain in mental age from year six to year ten for dull children tested over a period of four years. There is not much change in I.Q. Valentine (162) gives the results for one child tested six times by the Gesell Tests and three times by the Binet. The I.Q.s are very constant. The average Gesell I.Q. is 136 and the average Binet I.Q. is 150.

Influences Upon Intelligence Ratings. Freeman (56) gives a

general summary of the influences of environment upon intelligence. He discusses the different points of view. Thinking is a process of organization and hence education can improve it and improve intelligence. Barrett and Koch (**10**) study seventeen carefully matched pairs of preschool children. Those having had nursery school training from six to nine months show a gain of 20.9 I.Q. points, while those with no nursery school training gain only 5.1 I.Q. points. Cattell and Gaudet (**33**) find that the average I.Q. of various groups increases with repeated tests, and this increase is attributed to practice effect. Leahy and Fox (**98**) investigate the influence of emotion on the I.Q. A group of cases showing an observed emotional state (not an emotional breakdown) on the first test is compared with a non-emotional group. No significant change in I.Q. from first to second test is shown by either group. The re-test coefficient for the non-emotional group is .85 and for the emotional group .93, hence the authors conclude that an emotional state does not lower or raise the probable I.Q.

Carroll and Hollingworth (**29**) find that the Herring-Binet rates children lower than the Stanford-Binet. The average decrease in I.Q. for 80 cases ranging in I.Q. from 133 to 190 on the Stanford-Binet is 17.2 I.Q. points. Fifty-two of these 80 cases tested a year later show an average decrease of 19.2 I.Q. points. By comparing the two Binet tests with the Stanford Achievement, they conclude that the Stanford I.Q.s are the more valid. Steckel (**145**) finds that the I.Q. is influenced by the test used. With over ten thousand cases in grades I to XII tested on the Kuhlmann-Anderson, the N.I.T., and the Otis S.A. the author has prepared percentile tables with equivalent I.Q.s for each test for each percentile. Cattell (**30**) also finds differences in I.Q.s from different tests. She gives the median differences in I.Q. between the Binet and eight group tests. Kuhlmann (**95**) finds that degree of difficulty influences the intelligence score. Difficulty determines the amount of effort put forth by the subject. If a test is too easy, it becomes a speed test. No given test battery can give equally good results for three successive grades.

Individual Scales and Group Tests. Three new scales and two new group tests have recently appeared. A Point Scale of Performance Tests has been constructed by Arthur (**6**). This consists of ten tests in Form I and eight tests in Form II. The norms for Form II are re-test norms. The scores on each test are turned into points and then into M.A.s. The Stanford Revision has been adapted by Hayes (**74**) for use with the blind. Twelve new tests have been

substituted for tests unsuitable for the blind and minor changes have been made in others. The scale has been standardized on blind subjects. Linfert and Hierholzer (**100**) have published a scale for the first year of life. Series I consists of tests for one to four months; Series II for six to twelve months. A total score for each series gives an approximate M.A. The tests are largely based on the work of Gesell. It has been standardized on 300 infants, 50 at each age group.

Pintner (**132**) has constructed a non-language group test for Kindergarten, Grades I and II. It is given by the use of pantomime and samples on the blackboard. Cattell (**34**) has published a group intelligence test in England. It consists of three scales: Scale I for ages eight to eleven; scale II for ages eleven to fifteen; scale III for age fifteen up. There are two forms for each scale. The test contains the usual abstract verbal material.

Schieffelin and Schwesinger (**140**) give a description of 186 non-verbal tests. They give useful information as to publisher, price, bibliography, etc. MacPhee and Brown (**105**) report results for 134 cases on the Ferguson Form Boards. The re-test coefficient is .90. The scores show no significant age increase and the authors conclude that age norms are meaningless on these boards. Brown (**22**) reports results for 154 cases on the Kohs Block Design Test. He finds a correlation of .46 with N.I.T. mental ages. He does not believe the test has any clinical value. Norden (**120**) describes her plans for a new German revision of the Binet. She describes briefly the tests she proposes to use, which consist mainly of the original Binet tests and others added by various workers to other Binet revisions. As yet the scale has not been standardized.

The Elementary School Pupil. St. John (**149**) gives the distribution of composite I.Q.s obtained from several tests for 503 boys and 455 girls. The correlation with school marks is .44. There is more maladjustment in school among boys than among girls. He reports case studies of those showing great disparity between I.Q. and school achievement. Several reports deal with rural children. Baldwin et al. (**9**) study rural children in Iowa. They find no difference in intelligence between city and rural preschool children in 72 matched cases. On the Detroit Kindergarten Test the rural children are inferior to the urban. Rural school groups vary in I.Q.; one group having a mean I.Q. of 92.5, and another 103. The average I.Q. of 235 one-room school children is 91.7 as contrasted with a mean I.Q. of 99.4 for 425 consolidated school children.

Hatcher (72) gives a distribution of I.Q.s of 87 Virginia mountain children, showing a range from 46 to 114 with a median at 83. Ludeman and McAnelly (103) report results of 32 children living in a religious colony with a very restricted environment. The mean I.Q. for 13 cases in Grades II to IV on the Kingsbury is 72.6 and on the Myers 72.1. The mean I.Q. for 19 cases in Grades V to VIII on the N.I.T. is 66.3 and on the Myers 68.8. The authors conclude that these low I.Q.s are due to the very limited environment. Russell (139) in England reports results with the Northumberland Test in an eastern county. Among the county children ($n = 2958$) he finds 4.8 per cent having I.Q.s of 121 up; among the borough children this percentage rises to 7.5. The median I.Q. of the agricultural group is lower than that of the mining group. The more isolated the rural region, in general, the lower is the median I.Q. Hauck (73) in Germany finds children of industrial regions superior to those in agricultural.

The High School Pupil. Woody and Bergman (179) report results for seniors from many high schools. They give the correlations between intelligence on the Otis Test and achievement on the Iowa H. S. Content Examination. These correlations range from .37 to .50 for the separate subjects, with a correlation of .70 for the total examination for 800 cases. The average intelligence of seniors taking various courses is given, ranging from scientific, college preparatory down to agricultural, vocational. In the junior high school Marzolf (108) finds that I.Q. on the Terman Group Test correlates .66 with school marks. Hardie (70) reports results for 761 secondary school pupils in England. Intelligence correlates .37 with English and .28 with Arithmetic. Gardner and Hilton (57) compare 98 part-time children with 300 junior high school children in a rural district in Utah and find a mean I.Q. of 86.5 for the former and 94 for the latter. Stedman (147) finds a correlation of .55 between marks in bookkeeping and scores on the Terman Group Test. He believes that those with I.Q.s below 80 should not take up bookkeeping. In selecting children for high school scholarships Candee (26) found the I.Q. most significant. None below 90 received a scholarship and only one above 120 was rejected. Symonds (154) gives correlations between intelligence and other tests and marks in school subjects. He finds no good prediction from the various tests for specific courses in high school. Weisman (166) finds the Stanford-Binet helpful in educational counseling. He believes that high school work can be done by pupils with I.Q.s as low as 75, but repetition and a longer

time is required by those with I.Q.s below 100. Pyle (134) makes a study of 33 high school failures. He compares them with four successful students on various tests. In general the failures are below the age norms. He finds it absurd to talk of an I.Q. There are as many I.Q.s as there are functions to be tested. Turney (161) discusses factors other than intelligence which affect success in high school. Marks and M.A. correlate from .57 to .75 for four high school classes. He contrasts achievers and non-achievers. The former are those whose marks are one sigma above their intelligence rating and the latter are those whose intelligence is one sigma above their school marks.

The Private School Pupil. Three reports deal with private schools. Dearborn and Cattell (48) find a median I.Q. of 119 for 1,295 children in 12 private schools in the Boston area. They contrast this with a median I.Q. of 103 for 3,623 public school children. For the private schools Q_1 is 109 and Q_3 is 128; for the public schools Q_1 is 91 and Q_3 is 114. The private school median is well above Q_3 for the public schools. The Educational Records Bureau (Anon., 5) report a median I.Q. of 113.6 for 11,272 private school children and Q_1 is 105.3 and Q_3 is 121.4. The range is from 66 to 179. Only 3 per cent of the cases fall below I.Q. 90 and 29 per cent of the cases are above I.Q. 120. Private schools are in general very superior, but the medians of separate schools range from 99.5 to 124.3.

The College Student. Edgerton (53) reports an average correlation of .52 between intelligence and college marks. He gives numerous correlations between intelligence and marks for various colleges. He finds that the correlation between intelligence and marks can be raised from .52 to .98 by the cumulative addition of each quarter's scholastic record from the first to the sixth quarter. The C.E.B. Scholastic Aptitude Test correlates from .46 to .49 with freshman marks at Yale, according to Crawford (42). A multiple R of .74 is obtained by using intelligence score, school records and age at entrance. Lefever (99) finds a correlation of .29 between the Thorndike Test and marks for 884 freshmen at the University of Southern California. He also gives the correlations between intelligence and marks in each subject. These correlations range from .10 for Economics 4 to .49 for Pharmacy. Garrett (58) reports a correlation of .41 between C A V D scores and college marks for 314 freshmen, and he gives separate correlations for each subject. The highest is .57 with English. Kaulfers (88) finds the mean I.Q. of students taking Spanish to be lower than the mean I.Q. of students

taking French or German in the freshman year in college. Summer students make a higher score in intelligence tests than do winter students at Syracuse University, according to Keys and Reed (**90**), and the variability of the summer students is much greater. Lloyd-Jones (**102**) discusses the use of intelligence tests in student personnel work at Northwestern University.

There are six reports dealing with intelligence testing at teachers colleges and normal schools. Krieger (**94**) reports correlations of .46 between intelligence and first semester marks; .44 between intelligence and second semester marks; .535 between intelligence and both semesters' marks. She also gives correlations between intelligence scores and various courses, the highest being with education .63; the lowest with fine arts .31. Whitney and Leuenberger (**170**) report correlations of from .48 to .50 between intelligence and marks for 907 freshmen. Student mortality is heaviest in the lower deciles of intelligence. Garrison (**59**) and Cuff (**44**) report correlations between various intelligence, character and learning tests given to groups of students. Wagenhorst (**163**) finds no correlation for 191 teachers between intelligence or scholarship and success during the first year of service, and the correlation between ratings in practice teaching and the first year of service is only .23. Whitney and Frasier (**169**) summarize previous reports on the relationship between intelligence and student teaching success. The average of seven correlations is +.16 with a range from —.03 to +.35. Their own results show a correlation of +.24 for a group of 100 cases, and +.22 for another group of 70 cases.

The Superior. There are many reports dealing with the child of high I.Q. Terman (**156**) follows up his superior group and reports the results after six years. For 54 cases the mean I.Q. shows a decrease from 148 in 1921 to 139 in 1927, and most of this decrease is caused by the girls. For the older children the results cannot be stated in I.Q. These older cases are in the 97th to 99th percentiles of the Terman Group Test. The superior cases who are now students in Stanford University have a mean score on the Thorndike Test which is above the university mean. In general the majority of the cases are at approximately the same level of intelligence now as they were when tested six years ago. Duff (**51**) reports a follow-up of 73 cases with I.Q.s above 135 in 1921–22 on the Northumberland Test in England. He compares them with a control group of I.Q.s between 95 and 105. The superior send more replies to his inquiry. More of them have gone on to higher schools. A comparison of

seven control children now in secondary schools with thirteen of the superior group who have not gone to secondary schools shows the superior better in spelling and language. The mean size of family of the superior is 3.5, of the control 4.1.

Witty (175) reports results on one hundred gifted children with I.Q.s above 140. The social status of the group is high and the ancestry is mainly English, Scotch, German, and Jewish. The mean I.Q. is 152 and the mean E.Q. 136. The gifted are much above the controls in two character tests. After five years he finds the same superiority of the gifted in physical characteristics, but the Terman Group I.Q.s are lower than the Binet I.Q.s of five years ago. The correlation between these I.Q.s from different tests five years apart is .66. Stoke and Lehman (151) go over the studies of superior children and point out that those of high social status provide a smaller number of superior children. Less than one-quarter of the children with I.Q.s above 120 came from the professional classes.

Lamson (96) reports a follow-up of Hollingworth's gifted group of 56 cases. Most of them are now in high school. On Army Alpha all have A ratings, all are in the top decile of high school students and 53.6 per cent have already reached the top centile of adults in general. These gifted children are significantly superior to their comrades in scholastic achievement, although their chronological age is on the average two years less. The gifted excel the control in extra-curricular activities, and obtain better teachers' ratings in conduct. They have not suffered in health and 75 per cent say they are glad to have been accelerated in their school progress. Gerberich (63) finds that the superior high school student, who is in the upper decile in intelligence, graduates earlier than usual from high school and enters college early. The percentage of the gifted entering college is 68.8 as compared with 35 to 40 per cent for all high school graduates. In this gifted group 59 per cent are boys and 41 per cent girls. Students who enter college before age sixteen are studied by Gray (66). The average age for 126 boys and 28 girls in this group at Columbia and Barnard is 15.5. Their mean scores on the Thorndike Test are above the means for the whole student body. These superior students show slight superiority to other students in academic marks, but they took less time to graduate and gained more academic honors. They took part in more extra-curricular activities and did not seem to suffer in any way from their earlier college entrance.

Hollingworth (81) reports the annual measurements in height from 1923 to 1929 inclusive for 47 gifted children with I.Q.s above

130. They remain constantly about 5 per cent taller than unselected children. Hollingworth and Gray (82) find no correlation between the relative or absolute height or weight and the A.Q. for 50 gifted children. Inferiority in size is not a spur to greater accomplishment within a group of high I.Q.s working together in the same class.

The Feebleminded. Town and Hill (157) make an elaborate study of all the cases sent back to Erie County from the state school for the feebleminded. These 136 cases were supposed to be fitted for life outside the institution. They find that only 14 per cent have made a fair adaptation. They believe that 63.4 per cent are absolute economic failures. Complete case records are given of every case. Willhite et al.(171) report that there are 3,637 feebleminded in the State of South Dakota, and only 500 of these are in institutions. The incidence is about 0.5 per cent of the total population. The ratio of male to female is 59.1 to 40.9. Among 2,050 children, ages six to seventeen, 1.01 per cent are morons, 0.23 per cent are imbeciles and 0.06 per cent are idiots. Martz (107) reports that 10 out of 25 children born of mothers of low I.Q. were found to be of average intelligence. The children's I.Q.s are higher on the average than those of their mothers. Chotzen (36) makes an extensive survey of children in special classes in Breslau, particularly from the physical standpoint. He gives the distribution according to degree of intelligence based on a general diagnosis not wholly on intelligence tests. He then finds that the mean Binet I.Q.s of 400 cases are for those not feebleminded 94, for borderline 87, for morons 77, for imbeciles 61, for idiots 33. Bieber (13) takes the Binet definitions, similarities, differences and the like, as a basis for further questioning and conversation with feebleminded children. He uses this material for a discussion of the thinking of feebleminded children.

Delinquent, Dependent and Problem Cases. Adler (2) gives the percentages of 1,120 penitentiary prisoners making various ratings on the Army Alpha and says that these compare favorably with the army draft. In a state school for boys the mean I.Q. of 338 Cook County boys (Chicago) is 82 as contrasted with an I.Q. of 76 for 435 "down state" boys. The I.Q. distribution of 369 cases in a juvenile detention home is given and 35 per cent are rated feebleminded with I.Q.s below 70. Willhite et al.(171) in South Dakota give the intelligence distribution of 586 male and 21 female penitentiary prisoners: 11.8 per cent of the men and 19 per cent of the women are rated as morons or lower. Of 3,164 girls tested at the Women's Protective Association at Cleveland, Derby (50)

reports only 47 as ranking superior in intelligence with an I.Q. above 110. This is less than 1 per cent as contrasted with a normal expectation of 20 per cent. McClure and Goldberg (**110**) find the mean I.Q. of 84 unmarried mothers to be 77.1 with a range from 38 to 109 and a mean C.A. of 18.4. Caldwell (**25**) finds that 65 per cent of 408 boys and 78 per cent of 252 girls in industrial schools rate below I.Q. 85, whereas the normal expectation is only 11 per cent.

Paynter and Blanchard (**129**) report on 330 behavior cases at child guidance clinics, having excluded all cases with I.Q.s below 80. The mean I.Q. of these 330 cases so selected is about 100. Riley (**135**) reports the results of giving the Binet, the Arthur Performance and the Minnesota Mechanical Ability Tests to 65 probation boys. The average M.A. is a year higher on the performance as contrasted with the Binet Scale. Coleman (**38**) finds no difference in intelligence between 125 problem and 125 non-problem high school boys.

One report on dependent children by Davis (**46**) gives the I.Q. distributions for 1,051 cases in children's homes on two group tests. The percentage estimated as feebleminded is from 15 to 17; the percentage having I.Q.s above 110 is 5.3 on the Dearborn Test and 10.2 on the Haggerty Test.

The Deaf and Blind. Brown (**23**) finds a correlation of .80 between the Pintner Non-Language Test and the Arthur Performance Scale for 333 deaf pupils. This drops to .61 with C.A. constant. Both intelligence tests correlate about .40 with arithmetic score on the Stanford Achievement, but zero with reading score. Peterson and Williams (**130**) give a distribution of the Goodenough Drawing I.Q.s for 330 deaf children, ages four to thirteen. The mean I.Q. is 79.5, and 25.4 per cent are below 70 I.Q. Beilinsson (**12**) describes a special test of lip-reading ability. Hard of hearing children are investigated by Sterling and Bell (**148**). Their report on the intelligence of 585 cases gives only "above," "at" or "below average I.Q." The percentages of hard of hearing (having nine or more units loss) are 0.6, 1.6, and 3.7 in the above three categories, as compared with the normal in hearing whose percentages are 74.2, 71.7 and 60.8.

Merry (**115**) reports the first attempt to test a deaf-blind case. The Binet Tests are not suitable. Certain performance tests can be given. The time records are much longer than usual. Hayes (**74**) finds that the blind are 10 points in I.Q. below the seeing on tests which are suitable to both groups. In Myers' (**119**) survey of sight-

saving classes in the United States he gives a distribution of the I.Q.'s for 709 cases tested by means of intelligence tests. Of these cases 58.9 were below 90 I.Q. and 9.4 above 110 I.Q.

Racial Comparisons. Garth (61) sums up the intelligence testing of the past five years. He presents a very useful table of results and a bibliography of 176 titles. Witty and Lehman (177) discuss in general the results of intelligence testing among different racial groups. They conclude that none of the differences are certain and that they are not innate. A bibliography of 67 titles is given.

Three studies deal with negroes. Garth (62) presents results for 2,006 southern negro children in Grades IV to IX, ages six to twenty, tested by the Otis Classification Test. The average I.Q. is 76 or 78. The percentage reaching the white median ranges from 32 at age nine to 1 at age seventeen. The average E.Q. is 77 and the average A.Q. is 103. He argues for the great influence of educational opportunity on the I.Q.. Hurlock (83) finds white children slightly better than negroes on the Otis test of suggestibility. The average I.Q. of 194 white children is 102 as compared with an I.Q. of 93 for 210 colored children. Graham (65) compares negro and white college students on many tests. The mean superiority of the whites on all tests is +.51 Q. The overlap of the negro on the white in the rational learning test is 36 or 37 per cent. The superiority of the white groups in separate intelligence tests is as follows: Army Alpha +.57 Q; Myers Mental Measure +.86 Q; Otis Higher S.A. +.68 Q.

Two studies give a comparison of English and American school children on American intelligence tests. Wood (178) compares 1,260 English children with the norms for American private schools. The mean I.Q. of the English is 114.4, of the American 114.1. The I.Q. distributions of the two groups are very much alike. Powers (133) reports results for 253 English secondary school pupils on the Terman Group Test. The mean score of these cases with an average C.A. of 15.8 is much above the norm for American children in Grade XII with a C.A. of 18. These English pupils score higher than children in American private schools.

Winch (174) compares Christian and Jewish children in a London East-end elementary school on his reasoning test. The Jews are superior to Christians equated for age and social status. The Jewish boys surpass the Christian boys to a greater extent than the Jewish girls surpass the Christian girls. Delmet (49) gives the results of various intelligence tests on Mexican children. The average retarda-

tion by grades of the Mexican children as compared with the author's norms varies from 4 months to 1 year and 2 months.

Employment and Guidance. Beckham (**11**) tabulates from previous workers the occupations suitable for mental levels 5 to 12 inclusive. At year eight he finds a considerable amount of responsibility, and at years ten to twelve much responsibility and supervision. He reports his own results for 20 laundry employees and gives the average M.A. according to supervisors' ratings of their work. There are two studies on nurses in training. Metcalfe (**116**) reports the Army Alpha ratings for 331 nurses who graduated. The percentages of A or B ratings for the successful nurses is 87.3, for the failures the percentage is 44. Intelligence and theory grades correlate +.40; intelligence and practice grades +.14. MacPhail (**104**) reports results on the Brown University Test with probationers. Of those scoring less than 45 points, 8 out of 10 fail. The correlation with academic grades is +.76 for 35 probationers. For 32 juniors this correlation is +.50.

Taylor (**155**) gives I.Q.s for young printers. Compositors' apprentices and continuation school students average about 92 or 93 I.Q. points, but the average of pressmen's apprentices is only 67. Treat (**160**) deals with girls below I.Q. 70, and finds a correlation of +.36 between M.A. and garment machine operation. In training for power machine operating an M.A. over 8 is necessary, and in addition emotional stability and a certain measured ability on mechanical tests.

Sex Differences. Broom (**19**) compares 600 boys and 600 girls in Grades VII to IX on the Terman Group Test. The mean scores vary by a few points in favor of the boys but the difference is not statistically reliable. He also reports results for each sub-test. In general he finds no real sex difference. Hardie (**70**) in England reports results for 761 secondary school pupils, ages eleven to fifteen on an intelligence test. The mean score of the boys is exactly the same as the mean score of the girls, but the boys have a slightly larger S.D. Similarly Brolyer (**18**) finds that girls have smaller sigmas than boys on the C.E.B. Scholastic Aptitude Test. The girls are significantly superior to the boys on the verbal part of the test, while the boys are superior to the girls on the mathematical part.

Meltzer and Bailor (**114**) find no difference in Otis S.A. score between 32 women and 34 men college students. Wallin (**164**) reports results for many cases referred to psychological clinics for entrance to special classes. The I.Q. distribution for 1,019 cases in St. Louis gives a median I.Q. of 70.5 for boys and 63.8 for girls.

Twice as many boys are sent for examination. For another group of 3,644 cases, he finds a median I.Q. of 74.4 for boys and 71.8 for girls. The percentage of boys below I.Q. 35 is 1.0; of girls 0.9. Similar results are reported for a third group of 1,114 cases. In general there are fewer girls than boys; the median I.Q. for girls is lower; more girls fall below I.Q. 70; but more boys fall below I.Q. 35. Witty (**176**), however, finds that girls test slightly higher than boys, having a median I.Q. of 98.1 as compared with 97.1, for 1,049 clinic cases, made up of 585 boys and 464 girls. The range of I.Q.s is from 32 to 178.

Inheritance. Schieffelin and Schwesinger (**140**) give a survey of the main work on the inheritance of intelligence with many bibliographical references. Davis (**47**) finds the following correlations for various pairs of orphan children: .41 for 320 sibling pairs; .03 for 100 unrelated pairs; .77 for 23 twins. For non-orphan children he reports correlations of .52 for 106 sibling pairs, and .11 for 100 unrelated pairs. For sibling pairs in the orphanage for 0 to 3 years the r is .51; for 4 to 6 years the r is .34; for 7 to 9 years the r is .48. For unrelated pairs in the orphanage for these three periods of time the correlations are .06, .07, .06 respectively.

Hirsch (**79**) reports on 58 pairs of dissimilar twins living together, 38 pairs of similar twins living together and 12 pairs of similar twins living apart. Detailed data are given for all cases. The average differences in I.Q. for twins having similar environment is for dissimilar pairs 13.8 points in I.Q., and for similar twins 2.3 points. Thus the dissimilar twins show six times as much difference in I.Q. as do the similar in spite of the similar environment and hence such differences must be largely due to inheritance. The correlation for 38 pairs of selected similar twins is .97, for 58 pairs of dissimilar twins living together the correlation is only .53. He concludes that heredity is about five times as significant as environment in determining I.Q. differences. Bakwin (**8**) reports on 20 pairs of identical twins and finds the I.Q.s to be similar for all pairs except one.

Stoke (**150**) investigates social status and intelligence for 508 cases, ages six to eleven. The correlation between parents' occupational level and I.Q. is +.30. He points out that the number (not percentage) of children of high I.Q. (above 110) is important. The number of high I.Q. cases contributed by the high ranking occupational levels is very small, because these levels are sparsely represented in the total population. Dealing with high school seniors in many

schools Woody and Bergman (179) give the average intelligence rating in terms of S.D. for occupational levels of fathers. These range from +.24 sigma for "professional" to —.28 sigma for "farming." In this ranking "business" falls slightly below "artisans." Linfert and Hierholzer (100) find an average correlation of only +.06 for different groups of infants between socio-economic status and intelligence. But Witty (176), reporting on 458 pre-school cases, ages three to six, finds a correlation of +.48 between M.A. and Barr rating of fathers.

Miscellaneous. Two studies deal with the only child. Guilford and Worcester (67) compare 21 only with 141 not-only children in Grade VIII. The average I.Q. of the only is 108; of the not-only 103. The only are superior in occupational status, school marks, health habits and other personal characteristics. Blonsky (16) compares 33 only with not-only children in Grade I. He finds their average I.Q. to be six points above the average of not-only cases. Almost 50 per cent of the only children are above +1 sigma in M.A. of the total distribution. He discusses their character qualities and points out his disagreement with Fenton's findings in the United States.

Hauck (73) finds that bi-lingualism has an inhibiting influence on mental development in his comparison of Upper Silesian with other German children. Allen (3) investigates the effect upon an individual produced by knowledge of his own intellectual level. In general he finds it to have no influence on test or college achievement. Haefner (68) finds no difference in intelligence between left-handed and right-handed children. Babcock (7) presents a method of measuring the amount of mental deterioration. Hetzer (75) discusses various cases of infants tested by means of her "Babytests". Retarded physical development is not compensated for by advanced mental development. Kovarsky (93) gives examples of Rossolimo profiles, and Cattell (31) finds that Otis I.Q.s are not comparable to Binet I.Q.s.

Hilleboe (78) gives a survey of all types of special classes and the methods used for the selection of children for such classes. Knight and Manuel (92) find that children who enter school at age six surpass those who enter at age seven in their high school course. They give no intelligence tests, but estimate I.Q.s from parental occupation and conclude that the superiority of the younger group is not due to intelligence. Wilson (173) contrasts bright and dull children in the learning of a motor memory task, and Car-

roll (**28**) does the same for learning to spell. Kaulfers (**86**) finds that achievement in Spanish depends upon intelligence in addition to previous work, and the same author (**87**) finds that teachers' guessing of the probable foreign language ability of pupils correlates as high with final marks as do measures of intelligence. Coy (**41**) discusses various factors that influence the A.Q. and Morley (**117**) finds that the reliability of the A.Q. decreases with increase of correlation between mental and educational tests.

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EDUCATIONAL TESTS

BY VERNON JONES
Clark University
AND
MASON CROOK
University of California at Los Angeles

I. General

The most important trends which have been noted during the calendar year under review are, first, the ever-growing tendency for testing materials and methods to be incorporated in textbooks and supplementary teaching materials, and, secondly, the development of tests in the field of appreciations and attitudes. These two points will be discussed in some detail later, the former in section III and the latter in section II.

Three general textbooks on educational measurement have appeared during the year. Hildreth (50) has prepared an up-to-date treatment of the application of measurement and other psychological methods to the study of individual pupils in the schools. The book is addressed especially to school psychologists and to teachers and supervisors who have had considerable experience with testing techniques. Probably no other work in educational measurement shows so clearly the trend away from the survey emphasis in measurement and in the direction of individual diagnosis and adjustment.

Madsen (81) has prepared a textbook which specializes on the problems of measurement in the elementary school. In this book the author has been very successful in relating the facts of measurement to the broad problems faced by teachers and supervisors in the lower school. The relation which the testing movement bears to the improvement of methods and materials of instruction is pointed out in connection with each of the school subjects. Also the big problem of the relationship between measurement and the objectives of instruction comes in for consideration here and there. In no one section is the issue between the realists and the platitudinists in educational philosophy debated, but throughout the book one is made conscious of the fact that the measurement movement is definitely

allied with that educational philosophy which assumes that no one can be sure that objectives are being achieved until these objectives are stated in terms of responses which it is desired that the learner make and these responses are measured.

The third textbook which appeared during the year is that by Russell (122). The major emphasis in this book is upon the techniques of handling test results. It gives a very detailed account of the use of age, grade, and T-scores in solving certain school problems.

In addition to the general texts, two work-books have appeared. Greene (44) has prepared a work-book which is designed to give practice in the basic techniques of measurement. The topics covered parallel pretty closely those covered in the textbook by Greene and Jorgensen which was published in 1929. Park (103) has constructed a set of problems to guide students in the mastery of the basic principles and techniques of measurement. Most of the material covered is connected with the traditional problems of survey testing.

The usual annual review of the developments in the field of educational tests was prepared for the PSYCHOLOGICAL BULLETIN by Jones and Crook (62). The review was based on 162 articles and books.

Several studies have been made to determine the degree to which measurement is spreading to the college level. Four chapters in the Eighteenth Yearbook of the National Society of College Teachers of Education are devoted to this problem. A chapter by Raubenheimer and Touton (113) reports the degree to which standardized tests are used in higher institutions. Questionnaires were sent to 308 colleges, and of the 159 replying to the question about the use of achievement tests 131 stated that one or more such tests were being used. The test which was being used with greatest frequency was the Iowa Placement Examination. Hudelson (56) has scanned the literature for data bearing on the evaluation of teaching in institutions of higher learning. He finds little or no use being made of any objective measurements by supervisory officers to determine the efficiency of instruction. Haefner (46) hunts for evidences that quantitative measurement has influenced curriculum construction in colleges and professional schools, but he finds little to report at this level. A chapter by Manuel (83) is directed to the study of the attitudes of 108 professors of education toward the application of measurement techniques at the college level. It was found that

the so-called new-type tests were meeting with much favor, and that appreciable interest is being taken in prognostic testing.

Trinidad (147) has written a brief discussion of the use of standardized tests in normal schools. A comprehensive study of the colleges of the Lutheran Church in America has been made by Leonard, Evenden, and O'Rear (73). Of the 13 institutions questioned with respect to the use of standardized tests, one reports the use of achievement tests while two use intelligence tests.

The general problem of the relation of measurement to the aims in education—which was mentioned above in connection with Madsen's book—has been discussed in an article by Barr (2). He says that the two most important tendencies in education today, that of the development of measurement and that of the growing interest in non-informational aims, are in conflict inasmuch as the attention in measurement has been so largely centered on the testing of information. No one can deny that specialists in measurement must ever be alert to new objectives which are evolved as the school attempts to meet the changing demands of civilization. However, in view of the development in the last few years of measures of attitudes and appreciations, it seems that the conflict which Barr mentions is less serious than he indicates. In one series alone, that of Thurstone (144), there are scales already available for the measurement of attitudes toward God, toward the Church, toward war, toward the Negro, and toward birth control; and scales have been planned to cover attitudes on 26 other problems. Moreover, in the past year four tests in the field of appreciation have been devised. These will be described briefly in the next section under new survey tests.

II. The Development and Use of Tests for Survey and Experimental Purposes

(a) *Use of Tests in Studies of a Survey Nature.* A comparison between the achievement of pupils in the schools today with that of pupils in the schools of bygone days has been the subject of three interesting studies. One of these studies was conducted by Fish (35). A complete set of examinations given in 1853 was found together with a tabulation of the scores made at that time of 20 pupils. The examination was designed as an entrance examination to high school and was administered at the end of "nine pre-high-school grades." In 1929 this examination was given again in the

same city to 200 pupils selected at random from the eighth grade. The scoring was done by one individual and unfortunately no facts are given as to the reliability of the grading. However, since the examination consisted exclusively of factual questions, many requiring only one-word answers, it seems probable that the reliabilities of the averages were fairly high. The results taken as a whole are decidedly favorable to the 1929 group. The average number of errors made by the 1853 group was 16.2, whereas the average number made by the 1929 group was only 8.9. The greatest differences appeared in arithmetic where the former group made on the average 5.4 errors, while the latter made 1.6. In grammar the averages were 6.5 as compared with 3.1; and in geography 4.4 as compared with 4.2.[1] Another study of this same character—though covering a much shorter interval—was conducted by Tyler (149). The coöperation of various research workers in the schools of Ohio was obtained in unearthing old tests and administering them to comparable groups of present-day students. Data thus obtained on the differences in achievement were almost uniformly in favor of the present-day groups. Some of the differences were large enough to be considered statistically reliable. Remmers (114) compared the results obtained by the 1919 and 1929 freshmen in engineering at Purdue University on an identical test. He found that the 1929 group exceeded the other by a significant amount in four out of five subjects tested.

Such studies, of course, cannot be taken as conclusive evidence that the schools today are using their facilities to better advantage than the schools of the earlier day, because too many variables are left uncontrolled. However, the superior performance of the pupils today on a test like Fish's, which was based on the objectives and

[1] It is worthy of note in passing that these findings agree very closely with those obtained in an almost identical study made by John L. Riley in Springfield, Massachusetts, in 1905 and published in the *Springfield Republican* for November 12, 1905. In this study a set of examinations given in 1846, covering arithmetic, spelling, and geography, was repeated after a period of 49 years. About 80 pupils of the ninth grade were tested originally and about 220 in the corresponding grade were tested at the later date. The papers were scored by the same method in the two cases, and the results reported in percentage values. In each of the three subjects tested the average percentage score of the 1905 group exceeded that of the 1846 group; in arithmetic the average difference between the two percentage scores was 36, in spelling it was 11, and in geography it was 13.

curriculum of the days of the children's grandfathers, does speak well for their breadth of knowledge and skill.

A wide variety of testing was done for surveys and descriptive purposes. Gerberich (41) reports the results obtained in the Iowa high-school testing program over a period of five years. He finds that 68 per cent of the pupils in the highest decile of high-school graduates enter college, whereas only 35 or 40 per cent of all graduates enter. Eells (32) reports the results from a mental-educational study of 11,000 junior college students. The boys exceeded the girls in all subjects except English. Woody (164) reports a large amount of data collected in a testing program in the elementary and high schools of Michigan. Stalnaker (133) presents some facts coming out of the orientation testing program at Purdue University. Carreon and others (13, 14, 15, 135) report the standing of the children of the schools of the Philippine Islands on tests in the three R's and home economics. Dearborn and Cattell (28) investigate the accomplishment quotients of the children in three private schools. They find the median A.Q. to be up to 100 in only one out of the three schools. The most extensive testing of the purely survey type which is being done by any one organization is that in connection with the so-called Annual Nation-wide Testing Program which is being put on by the Public School Publishing Company. Torgersen (145) summarizes the results from the Seventh Program, in which 225,000 pupils in 46 states were tested on the Public School Achievement Tests.

Caswell (18) has made a careful study of school surveys, and he notes that the trend of emphasis in the measurement sections of such surveys is definitely in the direction of individual diagnosis and treatment of pupils rather than in the direction of standardization.

(b) *Use of Tests in Experiments.* Burks, Jensen, and Terman (11) report a follow-up study of the achievement of gifted children. A large group of children with intelligence quotients of 140 and above were selected for study in 1922. In 1928 an attempt was made to discover if these children were maintaining in school achievement a lead over the average run of pupils which was consistent with their intellectual gifts. On this examination, which covers English, mathematics, science, and history, the average score of the gifted girls was between 1.0 and 1.5 control σ's above the norm, while the average score of the boys was between 1.5 and 2.0 control σ's above the norm. In terms of percentiles the average

score of the gifted group on this test was 92, which means that only eight of the children out of 100 exceed the average score made by this group. The superiority of this group in achievement over the general run of pupils in high school cannot be doubted in light of these results. However, it is impossible to say whether or not these pupils are achieving at as high a level as is consistent with their I.Q.'s found six years earlier.[1]

Jensen and Jensen (61) review the literature on the influence of class size upon pupil achievement, and find the results conflicting. In an experiment of their own, in which they confine their attention to high-school algebra, they find significant differences in favor of small classes. Bloomfield and Brooks (4) also studied this problem at the high-school level, but, contrary to the findings of Jensen and Jensen, they do not find significant differences between small classes and large ones.

Holy and Sutton (55) report an experiment on the value of homogeneous grouping for algebra instruction. Two large sections equal in size and in ability were used. One class was made up of children as nearly homogeneous in intelligence and algebra achievement as possible; the other was heterogeneous. The experiment ran for 17 weeks. At the end of this time the homogeneous group exceeded the other on several standardized tests, but the differences were not large enough to be statistically reliable. Tharp (142) studied the problem of sectioning in Romance Languages by means of test results. He found that sectioning could be done quite accurately by means of the Foreign Language Test of the Iowa Placement Examination. His results show that the inferior students profited most from sectioning. Miller and Henry (86) here reviewed

[1] Since the lowest I.Q. in the group was 140, we should expect only about 4 children in 1,000 to equal the poorest of the group in general intelligence, and yet 8 pupils in 100 in the senior class in high school are exceeding the average of the gifted group. The authors do not attempt to say whether the selection in high school, which of course serves to boost the norms, is enough to account for this difference or not. But from the following calculation made by the writers it seems doubtful. According to F. M. Phillips (*A Graphic View of Our Schools*, Houghton Mifflin, 1927) out of 10,000 pupils who enter the fifth grade, 1,390 graduate from high school. On the basis of the known distribution of intelligence scores we should expect only 40 of these to exceed 140 I.Q., which is the lowest score of the gifted group, but this study reports that in achievement 111.2 (*i.e.*, 8 per cent of 1,390) exceed the average score of the gifted.

20 studies which have been conducted in the last 10 years on homogeneous grouping.

Smith (130) conducted a study to determine how accurately teachers judged the difficulty of tasks required of school children. Items from the Stanford Achievement Test were chosen as materials for the teachers to rate. The correlations between the true difficulty of the material and the teachers' judgments ranged from .45 to .86.

Scott (124) compared the educational achievement of native-born white children and Mexican children in the schools of El Paso, Texas. The Mexican children were found to be inferior in reading and arithmetic by a significant amount at most of the age levels covered.

Hollingworth and Gray (53) conducted an experiment with 50 superior children to test the Adlerian hypothesis that physically inferior individuals compensate for their inferiority by exercising special effort along other lines. It was assumed that if the hypothesis is correct then accomplishment quotients should correlate negatively with size. However, when the children were arranged in order of size from largest to smallest, there was no tendency found for the children in the lowest quintile to be different from those in the upper quintile in A.Q. when intelligence was allowed for. The experimenters conclude that whatever may be "the inner urges arising from perception of physical smallness, they do not in this sample exert any appreciable effect upon measurable scholastic performance." In this connection the work of Adams (1), who studied the relations existing among physique, intelligence, and proficiency in school subjects, is interesting. He found a low negative correlation between size and achievement when intelligence was partialed out.

Keys and Whiteside (64) found that among children of the same age, sex, and intelligence those markedly inferior in emotional stability were also distinctly inferior to educational achievement. Hildreth (51) reports some interesting and important data on children's growth in achievement from Grades II to VIII, as measured by the Stanford Achievement Test.

Stone (137) has experimented with his own practice tests in arithmetic to determine their effectiveness as an aid in teaching. He concludes that the use of tests produced a greater gain in ability than the regular work in arithmetic. The greatest gains were made by pupils with the highest intelligence quotients.

(c) *New Tests of a Survey Nature.* The most interesting and probably the most significant development in the field of new tests this year has been the attempt to measure attitudes and appreciation. The notable work of Thurstone (144) in the measurement of social attitudes has already been referred to. Moore (87) has experimented with a test designed to measure scientific attitudes in certain science work. By means of this test he attempts to study the important problem of the relation between scientific attitudes and factual knowledge. His results, on the face of them, indicate that there is a close relation between the two, but it is not certain that the measures of scientific attitudes used were wholly valid.

McAdory (78, 79) describes the construction of a rather elaborate art appreciation test (r_{11}=.87).[1] Speer (132) has prepared some interesting materials for the measurement of appreciation of poetry and prose (r_{11}=.67–.78). Hevner (49) reports preliminary results on a test for appreciation in music. The test consists of 14 items from the classics, each of which is presented in original form and in three variations. Vernon (151) proposes a method for measuring musical taste (r_{11}=.85).

Another new extension of educational tests is in connection with the measurement of the knowledge of the pre-school child. Buckingham and MacLatchy (10) have constructed a test consisting of six parts to be used in the study of the knowledge of number concepts possessed by children when they enter the first grade. The authors find, for example, that 90 per cent of the children examined could count to 10, and that 78 per cent of them could count out and hand to the teacher eight objects. Many other detailed facts of this type are given which may serve as norms. Sangren (123) has devised a rather comprehensive information test for use at the pre-school level and in primary grades. It covers vocabulary, number, nature study, social and civic information, literature information, and household information. Norms are given. The correlations of different

[1] Due to limited space only a very brief mention can be made of most tests. Abbreviations will, therefore, be adopted in reporting reliability and validity coefficients. r_{11} will stand for the reliability of a test, and r_{1C} will stand for the coefficient of correlation between the test and some outside criterion. Of course it will be impossible to interpret these correlations with any great accuracy without knowledge of the range in age or grade upon which they were based. However, in the space available only one or two statistical facts can be given for each test, and these coefficients are more significant than any other single figures which the authors report.

parts with mental age range from .46 to .73. Rockwell (117) discusses the use of the Cleveland Kindergarten-Achievement Test.

In the regular subject-matter fields a great number of new tests have appeared during the year. A tentative scale for rating prose and poetry of young gifted writers has been devised by Jensen and reported in a book by Burks, Jensen, and Terman (11). The scale consists of graded specimens ranging from the level of average performance of tenth-graders up to a level represented by the average work of some of the best writers in the English language (r_{11}, that is, 3 judges against 3 judges = .77). Otis and Orleans (101) have started a series of annual graduation examinations for use in the last grade of the elementary school. No data on norms, reliability, or validity will be available for these tests until they have already been used over the country and the results reported back to the authors. A new test will be made each year. Educationally, it is hard to see the advantage of such a test over the many standardized tests with established norms and reliabilities. The Public School Achievement Test (146), covering eight subjects of the elementary school has appeared. Grade norms are given (r_{11} for separate subjects ranges from .80 to .96). A new series of tests have been added to the Iowa Placement Examination (59). The tests in this battery appear to be among the best in the field.

Siebert and Wood (127) have prepared an aural French test for use at high-school and college levels (r_{11}=.97). Clapp and Young (22) have devised a test to measure grammar, capitalization, punctuation, and word forms (r_{11}=.85). The same authors (21) have devised an arithmetic test (r_{11}=.79). A unique feature of these tests by Clapp and Young is the ingenious self-marking device which is employed. Hartley (47) has made a test which is designed to measure children's ability to interpret poetry (r_{11}=.85–.95; r_{1c}=.80). Poley (108) has devised a test to measure high-school students' ability to get the gist of what they read (r_{11}=.80). Nelson and Denny (95) have published a reading test which measures word knowledge and ability to understand paragraphs. Percentile norms are given for high-school and college levels (r_{11}=.91). A test designed to measure the word knowledge of Italian children in the primary grades of the American schools has been prepared by Hill (52). Pressey and Pressey (111) have prepared a word reading test for use in the first grade (r_{11}=.93). Breslich (6, 7) has produced an algebra test and a geometry test. Tentative norms are

available. Presson (112) has prepared a biology test. Percentile scores are given (r_{11}=.83–.92; r_{1C}=.79–.84). Persing (107) has prepared a test for laboratory knowledge and techniques in chemistry (r_{11}=.87). A test on the United States Constitution has been designed by Bear (3). Grade norms are given (r_{11}=.96). Tyler (150) has prepared a test which purports to measure ability to generalize in general science. Cuff (27) has devised a new vocabulary test (r_{11}=.87). Woody (167) discusses the development and use of a vocabulary test to measure the growth in students' vocabulary during periods of study of Latin and French. DeMay and McCall (30) have prepared a brief survey test in fractions to accompany their Standard Test Lessons in Fractions. The survey test is designed to identify early those pupils who should receive diagnostic and remedial treatment.

Wood and Lerrigo (163) have designed an important test of health knowledge and habits for use over the whole school range. It consists of three parts: the healthy organism, the healthy personality, and the healthy home and community.

Engle and Stenquist (34) have published a home economics test covering foods and cookery, clothing and textiles, and household management. Complete age and grade norms are given (r_{11}=.90 and above; r_{1C} for different parts ranges from .52 to .90). Two mechanical drawing tests have appeared: one by Nash and Van Duzee (93) and the other by Wells and Laubach (155). McLaughlin (80) has devised a test of shorthand (r_{1C}=.73). Mann (82) has prepared a test to measure certain aspects of engineering education.

III. The Use and Development of Tests in Diagnosis and Remedial Teaching

(a) *General Trends in the Development and Application of Diagnostic and Practice Tests.* As was stated in the first section of this article, one of the most important trends in educational testing today is the trend toward the incorporating of test material and methods in the construction of textbooks, practice exercise books and other teaching aids. This trend is well illustrated in a discussion by Gates (40) of the advantages of modern practice tests over old-fashioned drill methods for the elimination of specific defects. This trend is even more strongly emphasized by the appearance in many fields of practice exercise books, unit tests, and the like. The follow-

ing is a partial list of such material which appeared during the year: Strayer, Mort, and Dransfield (138), check tests to accompany a supplementary geography text; Webster (152), oral tests in English; Smith, Reeve, and Morss (128), exercises and tests in algebra; Goddard (42), practice exercises in algebra; Witchcraft (162), practice exercises for arithmetic; Wrentmore (168), practice exercises for grammar and language usage; Smith (129), practice exercises in physics; Hyde (58), unit tests in American history.

Probably the most challenging article of the year so far as technical trends within the field are concerned is one by Greene and Buswell (43) on diagnostic methods in arithmetic. These writers make a distinction between group and individual diagnosis, and indicate that most of the so-called diagnostic tests available today are good for group diagnosis but that they are relatively useless for individual diagnosis. Their main contention is that the chief function of individual diagnostic testing is to supplement the discovery of types of errors by the discovery of causes of errors, and they maintain that the only way to discover these causes is to observe the child's method of work as he attacks problem after problem. In other words, it appears that they deny the possibility of satisfactorily diagnosing a pupil's difficulties by any test whatsoever; the test, according to their scheme, would be used only as a device for eliciting responses, but the main part of the diagnoses would be the careful observation of each step taken by the child as revealed by such overt behavior as thinking-out-loud, hesitating, erasing, etc. In the minds of the reviewers, there is no doubt that pupils' final answers to problems in diagnostic tests do not always reveal the exact strengths and the weaknesses in their knowledge, and that in some cases the study of a child's method of attack upon a problem is an excellent procedure, but there are many cases where the tests, for all practical purposes, exclude one possibility after another so that an analysis of the problems missed will serve so to limit the field in which the real difficulty lies that remedial teaching can be directed toward the weakness with rather great precision. The authors have made out an excellent case for the method in which they are most interested, but it appears that it would be unfortunate if all the development in individual diagnostic testing were bent in the direction of this one method.

(b) *Experiments in the Use of Diagnostic Tests and Remedial Procedures.* Pressey (109) reviews the experiments which have been conducted on the use of diagnostic testing and remedial teaching at

the college level. Pressey and Pressey (110) describe an experiment in the use of the special reading exercises with college freshmen. The lowest fourth of freshman classes was given this special training, and marked improvement was noted both in reading and in general academic work. Lyon (77) describes the use of the Pressey Diagnostic English Test and other materials in a study designed to improve the English of freshmen in a School of Agriculture in a state university.

Leonard (71) describes the use of diagnostic tests and practice exercises in an experiment in English. In general the results seem to favor the use of such material though it is impossible to be sure, since adequate controls were not employed. Woody (165) describes an experiment designed to determine the efficacy of the use of reading drills for the improvement of ability in problem solving in arithmetic. Results favorable to the use of such exercises were found. Rosse (119) conducted an experiment in which the Lennes Test and Practice Sheets were used in one group in arithmetic while another group was held as a control. The experiment ran for three months, and at the end of this time the experimental group exceeded the control group by an amount which was 2.4 times the probable error of the difference.

(c) *New Diagnostic Tests.* Symonds and Daringer (141), continuing their studies in English expression, have published an analysis of common errors in sentence structure. The Bureau of Reference, Research and Statistics of the Board of Education of New York City issues at intervals bulletins for classroom teachers on diagnostic methods. The diagnostic tests in arithmetic (96) and in map reading (97) which have recently been devised and issued in bulletin form by this Bureau are especially suggestive. Leonard (72) has published a diagnostic test in punctuation and capitalization. It is designed for use in all grades from the fifth through high school.

A score card for rating teachers and diagnosing their strengths and weaknesses has been worked out by Carrigan (16). It consists of two parts, one to be used after a supervising visit of around 45 minutes; the other to be used after longer contacts.

IV. Development and Use of Tests for Prognosis and Guidance

(a) *Prediction of Success in Higher Education.* The most important recent development in this field is the wide use of aptitude tests in the study of applicants for admission to medical schools. In

the 1928–1929 session 1,552 medical and premedical students were tested on the Moss Scholastic Aptitude Test for Medical Schools, and in the 1929–1930 session 5,916 were tested. A committee was appointed in 1930 by the Association of American Medical Colleges to make further experimental study of aptitude tests. Moss (**90, 91**) finds the correlation between his test and first-year grades in medical colleges to be .59, and between his test and second-year grades to be .54. Not a single failure was found in freshmen or in sophomore years of students who stood in the upper decile on the test, whereas 56 per cent of those in the lowest decile failed. He finds pre-medical grades to correlate .50 with first-year grades. Personal interviews were also studied as a means of predicting success, but they were found to be very unreliable. His general conclusion is that a combination of aptitude test scores and pre-medical grades (with the possible addition of the results of interviews in special cases) represents the best means for predicting success in medical school work.

Stoddard (**136**) has surveyed the literature up to 1930 in connection with the problem of the degree to which college success can be predicted from test scores and school marks. Crawford (**25**) presents data on the prediction of freshman grades at Yale. The examinations of the College Entrance Examination Board were found to correlate with first-year grades to the extent of .44. When various other available data, including high-school marks, are combined with the examination scores, the correlation is raised to .70. Nelson (**94**) reports that the results obtained on the Iowa State Teachers College Test at the beginning of the year correlates to the extent of .56 with first-term English grades in that college. Correlations between results on other tests and English grades are also given, but these are lower, ranging from .33 to .41. Hartson (**48**) reports the results of a five-year study of the use of tests for sectioning college students in English composition. It was found that a battery consisting of three brief tests identified 49 per cent of the students who subsequently made low grades in the course.

(b) *Prediction of Success in Teaching.* Krieger (**66**) has made an elaborate study of four tests which seemed most promising for prediction of success in teaching. Certain new factors are suggested for inclusion in such tests. A plea is made that future test-builders in this field attempt to predict success in actual classroom instruction and management instead of success in professional courses.

(c) *Prediction of Success in Elementary and High School.* Hughes (57) reports a study of Latin prognosis in which a large number of tests were employed and an extensive array of correlations were computed. Some of the correlations found are rather astonishing. Probably the most interesting fact reported is that the results from a battery of four achievement tests and one intelligence test given at the beginning of the year correlated to the extent of .90 with the scores obtained on the New York Latin Achievement Test at the end of the year. The battery consisted of the following tests: Thorndike Word Knowledge, the New York Sentence Structure, the Charters Language, the Charters Grammar, and the Terman Group Test of Mental Ability. According to the figures reported, the Orleans-Solomon Latin Prognosis Test does not predict final achievement in Latin as well as does the Terman Group Test or the Thorndike Test of Word Knowledge. Ross and Hooks (118) have made what appears to be a superficial survey of the literature on the prediction of high-school success. They conclude that elementary school records form the most satisfactory basis for predicting achievement in high school. Their conclusion is based more on the consideration of convenience of obtaining scores than on the accuracy of prediction. The possibility of combining test results with elementary school grades for the purpose of improving prediction does not receive due consideration.

(d) *Prediction of Success in Music and Art.* Four articles have appeared during the year on problems connected with musical prognosis. Larson (69) applied the Seashore Measures of Musical Talent to high-school orchestras and music classes in which careful ratings of ability had already been made. He found that the group which was rated the lowest did not consistently show low scores on the Seashore test, but the highest groups did get high scores on the test. Stanton and Koerth (134) gave the Seashore test to a group of 157 students at the beginning of their music course and repeated the test at the end of the course three years later. The correlations between initial and final test results range from .45 to .83 for various parts of the test. Nielson (99) reports a study of the Seashore Motor-Rhythm Test which is a new departure in the testing of musical capacity. Significant correlations were found between this test and other measures of musical ability and musical performance. Wilson (161) suggests the use of three tests for use in musical prog-

nosis: tonic memory, resolution, and score reading. The combined score on these three was found to correlate .29 with grades in music courses, whereas the Seashore battery correlated .25. In considering these correlations it is of interest to note that scores on an elaborate questionnaire on musical background correlated with these same music grades to the extent of .41.

Whitford (159) has published a textbook on art education which contains rather comprehensive chapters on the art tests now available.

(e) *New Prognostic Tests.* Symonds (140) has completed the third revision of his foreign language prognosis test. This appears to be one of the best tests in this field. The results from two forms of the test combined correlate .71 with achievement in foreign language one year later. Luria and Orleans (76) have also published a test in this same field. It consists of several language lessons and a test with each lesson. It correlates .68 with scores in modern language achievement at the end of a year course. The Lee Test of Algebraic Ability (70) has appeared. It is still in the experimental stage.

A prognosis test designed to predict teaching ability has been devised by Coxe and Orleans (23). By way of validation, the test has been correlated against tests of achievement in normal school work administered one year later. The correlations range from .53 to .83. An aptitude test for nursing is being constructed by Moss and Hunt (92), but the measure at present is only in the experimental stage.

Crockett (26) presents a new test of complex manual ability which purports to predict success in shop work. The correlation between the test and performance in various shop tasks is in the neighborhood of .60. It correlates only .31 with the Detroit Mechanical Aptitude Test. Paterson, Elliott, Anderson, and others (104) describe in great detail the standardization of the Minnesota Mechanical Ability Tests. Various combinations of the tests in the series correlate with success in shop work to the extent of from .53 to .73. The reliabilities of various parts of the test are, on the whole, higher than for any other test in the field. They range from .86 to .94. Strong (139) has devised and standardized a vocational interest questionnaire. Norms are given only for men. This appears to be the best device of its kind that has been developed.

V. Development and Use of Tests for Improving Marks and Marking Systems

Three books on teachers' informal examinations have appeared this year. Lang (**67**) has written for teachers and supervising principals a well-balanced book on modern methods of constructing and interpreting teachers' informal examinations. Naturally the book contains a discussion of the so-called "new-type" examinations, but it is more than a mere discussion of these methods. Such practical problems for the teachers as the following receive attention: use of examinations for motivation in reviews, the methods of improving the essay-type test, methods of improving school marks, etc. He recommends the converting of test scores into school marks on the basis of the percentage scheme: highest 6 per cent should receive A's; next 25 per cent, B's; next 38 per cent, C's; next 25 per cent, D's; and the lowest 6 per cent, E's. No discussion is given as to what adaptations of this scheme, if any, should be made in cases of special selection.

Michell (**84**) discusses the use of "new-type" examinations as aids to instruction in history. Her two main points are, first, that since so much material can be covered in a short testing period such tests have diagnostic values; and, second, that testing can be easily and frequently done, thus encouraging better study habits and greater effort on the part of the pupils. Each of these points is elaborated in some detail, and suggestions are given concerning the construction of "new-type" tests to accomplish these objectives.

Ruch and Rice (**120**) have published the 36 best examinations submitted in a prize contest. This collection represents the greatest variety of specimens of "new-type" examinations now available in one volume. The examination by E. Riley, entitled "Working Skill Test in Social Science Material" is especially ingenious and would seem to be worthy of standardization. In addition to giving the best specimens, the authors have made an interesting analysis of all the examinations submitted in the contest. They find that 30 per cent of the test items were of the completion type, 24 per cent of the true-false type, 16 per cent of the multiple-choice type, and 11 per cent of the matching type. The remaining 19 per cent were divided up among 13 other types.

Wells (**153**) reports an examination of the "new-type" variety which has been used with success in testing students' mastery of psychiatry.

Brinkmeier and Ruch (9) report an investigation of the degree to which the phraseology in true-false test items suggests the proper answer. Brinkmeier (8), in another study, finds a tendency for the longer statements in a true-false examination to be true.

VI. Intensive Study of Current Instruments and Techniques

Foran (37) discusses at some length the question of validity of present measuring instruments. The point is made that the most significant limitation of current tests is the lack of knowledge about what the tests measure. He makes the suggestion that improvement may come through validation of sub-tests as wholes, as well as the validation of individual items. In another article (36), in which he studies spelling tests, he concludes that the form which the questions take has an important bearing on validity. He finds recognition forms in spelling to be relatively unsatisfactory; the "modified sentence" form he finds to be the best. Lindquist (75) criticizes the norms offered for many educational tests, particularly at the high-school level. He feels that variability is not properly taken into account. He suggests that separate norms based on different types of schools would be more serviceable in many cases than the norms based on such composites as are frequently used at present. Lincoln (74) discusses at some length the problem of the equality of units in the age, percentile, and standard deviation scaling systems. He makes the unusual claim that the units on a percentile scale or an age scale are just as nearly equal as those on a standard deviation scale. The established view of specialists in statistical methods is at variance with this conclusion.[1] An interesting debate between Kelley (63) and Wilson (160) has developed concerning the inclusion of many words in the Spelling Test of the Stanford Achievement battery which are far too difficult for the children in the middle grades to spell. The debate served to bring out clearly the advantages and disadvantages of steeply graded tests.

Miller (85) has made a critical analysis of certain parts of the Iowa Placement Examination. He concludes, among other things, that the best examination for placement in school is one which emphasizes fundamentals, and that the best measure of aptitude for a

[1] See Garrett, H. E., *Statistics in Psychology and Education.* New York: Longmans, Green, 1926, pp. 109–111.

Also McCall, W. A., *How to Experiment in Education.* New York: Macmillan, 1923, pp. 94 ff.

school subject is one which tests the student's ability to comprehend reading material in that subject. Rice (116) has studied various leading French and Spanish tests. He points out what he considers to be defects in the foreign language section of the Iowa Placement Examination. Shank (126) has studied the types of responses which students are called upon to make in various reading tests. Foran and Rock (38) have investigated the reliability of seven silent reading tests. They advocate the use of the ratio between the probable error of estimate of a true score and the standard deviation of the distribution as the best single measure of reliability.[1] This ratio is thoroughly useless for this purpose, however, as can be seen from the simple fact that a test having a reliability of .20 will receive precisely the same rating in this formula as one having a reliability of .80.

Two studies on the reliability of the Trabue French Composition Scale have appeared. Breed (5) investigated the extent to which teachers agree in scoring a given set of papers by means of the scale; he finds on the average a correlation of .87 between the scores assigned by two teachers. Ford (39) investigated the number of samples of a given child's work which would be required to measure accurately his composition ability. The correlation of one 10-minute composition with another 10-minute one was only .51. When the average score on four 10-minute compositions was correlated with the average of four others the coefficient rose to .81.

Larson (68) has made a careful item-by-item study of the Seashore Measures of Musical Talent. New norms have been determined, but they differ very little from those previously reported. New facts on reliability and validity are given. It was discovered that most of the tests could be shortened somewhat without appreciable loss in reliability. Coxe and Orleans (24) describe the methods and the results of analyzing and revising their Teachers' Interest Test and their Prognosis Test of Teaching Ability.

Scudder and Raubenheimer (125) have obtained some very interesting results from a study of the intercorrelations among the

[1] This an adaptation of the ratio of $\frac{\sigma_1 \sqrt{r_{11}-r_{11}^2}}{\sigma_1}$, which was suggested by T. L. Kelley, *Statistical Method*, p. 215. On an unreliable test the σ would be greater than on a reliable one, due to errors of measurement being introduced. However, the σ in the numerator and that in the denominator would be equally affected by this; therefore the critical part of this formula is the value $\sqrt{r_{11}-r_{11}^2}$

following measures of mechanical ability: Stenquist test scores, MacQuarrie test scores, O'Rourke test scores, and shop teacher grades. The intercorrelations range from 0 to .49. These challenging facts should lead to further research in this field to determine what, if any, unique capacities or achievements are being measured by mechanical aptitude tests. Revised median and percentile scores have been obtained on the Detroit Mechanical Aptitude Examinations (**31**). Wells (**154**) describes a new procedure for administering the O'Conner "Work sample 17" whereby the reliability of the test is increased.

Peet and Dearborn (**106**) report revised age and grade norms for their survey test in arithmetic. New facts on reliability are also given. r_{11} for the section on problem solving was found to be 86; r_{11} for the section on fundamental processes was found to be .95.

Morley (**89**) has made a study of the reliability of the accomplishment quotient. Otis and Orleans (**102**) have published a manual designed to assist teachers in transmuting test scores into terms of school marks.

VII. Bibliographies

Newland and Toops (**98**) have compiled a bibliography of 664 titles bearing on measurement in higher education. Woody (**166**) has prepared a list of tests for use at the college legel. Useful data are given concerning each test listed. Kinder and Odell (**65**) have also prepared an annotated list of tests for use in colleges and have appended a bibliography of 321 titles bearing upon measurement at this level. Odell (**100**) has published the third revision of his annotated list of high-school tests.

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MEASURES OF CHARACTER AND PERSONALITY

BY GOODWIN WATSON
Teachers College, Columbia University

This review of tests of character and personality aspires to be more selective than extensive. In the endeavor to focus the review and to introduce perspective into it, certain related articles have been eliminated. Discussions of the nature of character and analyses of particular traits have been eliminated from this review. Such indices of character and personality as crime, delinquency, scholastic failure, being tattooed, being elected to offices, insanity, truancy, reference to problem clinics, socio-economic status, living room equipment, and so on, although studied in one or more articles during 1930, have not been included in this review. A very large number of articles involving glandular disorders have been excluded, although such observations have an important significance for personality. Measures of appreciation or creative ability in the arts have been excluded. Studies of religion have been excluded unless specific attention was given to measuring character correlates. The large number of ratings and tests on vocational aptitude, success in teaching, and the like have been eliminated. Studies of motivation in animals, while certainly involving the principles of character measurement, have been excluded. Discussions of typology, constitution, and eidetic personality, have for the most part been excluded, although mention is here made of the unusual interest in articles by Krasusky (**86**) on Kretschmer's constitutional types in 1,100 children, by Zillig (**171**) and Thomas (**147**) on Jaensch's three types. Measures of group life and social phenomena have not been included, although McCormick's scale for measuring social adequacy (**103, 104**) must be singled out for this special mention. The major exclusion was the total field of individual case analyses, from which most of the deductions about personality adjustment are being drawn. These related areas which are not quite close enough to the center of the problem for inclusion in this review may suggest needed supplementary summaries.

Six related summaries were published during 1930. May, Hartshorne and Welty (**111**) published their review in this magazine a

year ago. Allport and Vernon (4) reviewed the field of personality, covering 327 titles. Bain (10) reviewed the theory and measurement of attitudes and opinions, a matter of some 260 studies. Boven (17) covered 50 contributions to characterology. Guilford and Braley (57) managed to gather more hope than this reviewer can from the 53 conflicting studies relating to extraversion and introversion. Raines (126) offered nearly 300 titles in his review of emotions.

The titles of studies reviewed in this summary will be classified under the following headings:

1. Conduct Measures
2. Behavior Observation
3. Characterological Indices
4. Laboratory Tests
5. Physiological Tests
6. Knowledge and Ability Tests
7. Attitude and Opinion Tests
8. Interest Reports
9. Self-Description
10. Reputation Measures
11. Combinations and Batteries.

Within each section attempt is made to group studies of a kind together, presenting first and most prominently, the most valuable studies.

I. Conduct Measures

The outstanding contribution in this field was the publication by Association Press of some thirty tests used by Hartshorne and May in the Character Education Inquiry. Many of these are conduct tests, notably the measurement of honesty by the Self-Scoring Intelligence and Achievement Tests (160), Attitudes S-A Test (160), Coördination Test (160), Self-Scoring Speed Test (160), some activities related to a Stunt Party (160), an Athletic Contest (160) and a series of puzzles (160). Tests of service and coöperation included the Maller test (160) and the Kits, Envelope, and Money Votes enterprise (160). Measures of persistence include the Maller tests (160), Stories and Puzzles Test (160). Ability to resist distraction is shown in the Ruggles test (160), the Speed Test I (160), Stunt Party (160), Stories and Puzzles and Safe tests (160). Another simple and excellent test of cheating, developed by Maller, has been made available (109).

Conduct tests adapted to particular situations have been tried out, most of them in connection with some form of cheating. Steiner (136) showed that his seventh graders did not cheat quite

as much as his fifth graders. Zillig (**170**) studied 270 public school children and 64 boys in an orphanage by tests involving difficult problems on which the class falsely reported success, the taking of articles loaned to the children, and unjustified bragging about their possessions, ability, and parents. The findings agreed generally with the previous work in this country; that desire to succeed and to secure approval is quite as apt to lead to lying as is fear of punishment; that tests of moral knowledge are not good indicators of honest behavior; that there is some correlation between honesty and intelligence; and that children handicapped by poor homes and poor environment are generally less truthful. Stoke and Lehman (**137**) tested overstatement among college students about books they were supposed to have read. Again the dull students were least trustworthy. The writers made the interesting suggestion that this exaggeration may account for the negative correlation between grades and reported hours of study. An anonymous professor (**7**) found 46 per cent of his freshmen and 25 per cent of his juniors raising the scores on a test which they marked themselves. Newcomb and Watson (**115**) found from 12 per cent to 20 per cent of graduate students in education taking similar advantage of the opportunity to raise their scores; again there was evidence that those who most needed the credit were most apt to use underhand methods for getting it. Campbell and Koch (**23**) found more cheating among 100 students who had just heard two lectures on honesty than among a control group. Forty-four per cent of students from high schools with honor systems cheated, whereas 31 per cent was the average for those without such training.

Outside of the field of honesty few new conduct tests were described. Kendrew (**80**) tested the strength of motives in children three to six by their ability and willingness to pile up dominoes when offered food, satisfaction of curiosity, competition with others, and competition with their own record. In general the incentives were much alike, but the slight differences placed them in the order just stated. Distractions in most cases seemed to improve rather than to decrease interest and effort. Leuba (**98**) found pupils whose performance of a task had reached a plateau, responding by 50 per cent to 60 per cent improvement in response to rivalry, praise, social recognition, and chocolate bars. In general those originally abler responded with larger increases. Boys, having done poorer work than the girls under no-incentive conditions, made larger gains.

Lewin and Freund (99) used a measure of persistence with simple laboratory tasks carried out according to the inclination of 12 female subjects. Their results pointed to faster work during the menstrual period, but to less inclination to carry out these activities and less persistence in them at this time.

II. Behavior Observation

Goodenough (55) and her co-workers observed the behavior of 33 nursery school children and developed a method for describing units of behavior that could be quantitatively compared. Twenty-five one-minute observations were made on each child. The reliability of observations on compliance was .5, on talkativeness .6, laughter, sociability, leadership and physical activity each about .8. Intercorrelations among these observations and with data from rating scales and personal histories indicated that sociability, leadership, and talkativeness are rather closely interrelated; intercorrelations generally above .6. Height, weight, chronological age, and mental age are positively related to these leadership factors. It is interesting to observe that teachers' ratings on individual beauty and attractiveness of personality showed correlations of .5 or .6 with Merrill-Palmer mental age. Physiological tests, health measures, position in the family, size and status of the family, the child's sex, seemed to be unrelated to any of the measured behaviors.

Herring (66) pursued a very careful experiment over several months in observing the response of nursery school children to taste stimuli. The observational procedures were refined until agreement between one series of observations and another reached correlations above .9. The experiment in general showed a decrease in extremes of behavior, both liking and disliking, tending toward neutrality as the stimuli were repeated.

Newcomb's (114) observation in camps, more fully reported previously, was briefly reviewed. He found no consistency in the actual behaviors usually classified by trait names or in such types as introversion-extraversion. Farmer (44) observed more than 600 boy apprentices and described five types of behavior. The correlation between the type rating and industrial proficiency measured by a practical test was .21. This was somewhat inferior to a battery of objective psychological test.

III. Characterological Indices

Most of the characterological work comes to us from Germany. An outstanding contribution is Roemer's (129-132) series of four articles. He began with the Rorshach pictures, using a stenographic report, behavior description and detailed timing. He added the feature of asking the subject at the close of the test to sketch the figures he had seen in the test blot. Drawings appeared to Roemer to depend very little upon training in drawing, but a great deal upon the liveliness of interpretation. He found students in teacher training institutes dull and pedantic in contrast with the humanistic Gymnasium group. A further test in this series was made up of pictures from which the subjects were asked to choose those they liked, scenes in which they would like to be present, people whom they would like to be, types of girls they found attractive. The Gymnasium students were very critical, the vocational school boys being attracted to many persons and situations which the other class rejected. A follow-up of a few subjects six years later showed that their personalities retained many of the same characteristics posited on the basis of the earlier tests. Case studies show how the symbolic interpretations lead the girl suffering from insomnia, the girl secretly married, the dentist, the homosexual, the repressed student, to "give themselves away" because they did not realize that they were reading into the picture their own mental states. One interesting report showed a variation in the same subjects at the beginning, middle, and end of a long mountain climb. In the final article Roemer describes an apparatus for recording breathing graphically in a natural fashion and over a long period of time. He shows the close correlation between breathing curves and hesitations, repressions, anxiety, and exclamatory feelings during the picture interpretations.

Beck (11) used the Rorshach tests on 69 children at Randall's Island. Four cases are presented showing clear-cut differences between one who is feebleminded and one of superior intelligence, between a psychotic and a behavior problem. Proportions of "movement" and "color" interpretations are taken to be diagnostic of "emotional lability," "interiority" and "exteriority."

Krauss (87) used symbolic drawings in which subjects were asked to describe by line drawings how they felt when happy, furious, sad, or longing; how they would express the feeling of iron, gold, glass, wood. These were not representative drawings, of

course. Many similarities appeared among different persons in the representation of their emotional states. "Rage" was characterized by heavy, angular lines; "longing" by soft lines curving upward, and so on. Subjects who did not participate in the original experiment correctly matched the line drawings and the named emotions in more than 70 per cent of the cases. Struve (142) tested more than 200 adolescent boys and girls with vague pictures like the Rorshach gray blots, an interrupted story to be completed, and a story composed around two stimulus words. The subjects were classified as those who were merely enumerated, those who expressed an intuitive type of imagination in which complex actions appeared spontaneously, and those with fantastic or rational inventions. More than 80 per cent of the children were consistent in the several tests, and the types agreed even more closely with instructors' ratings. Boys were in general more inventive than girls.

Wolff (167) tried to separate out from the total personality certain definable indices. In one experiment subjects spoke a sentence onto a phonograph record and also wrote the same sentence. The proportion of correct matching by judge was five to two. Personality descriptions matched with handwriting were correct in 41 cases where chance would have provided 26. A photograph profile matched with handwriting showed 24 correct with 20 likely to be correct by chance. Lembke (95) compared the drawings of 17 bold pupils with those of 17 shy pupils and found the latter to use sharper delineation and brighter colors. Ziehen (169) reviewed the whole field of characterology, suggesting research methods and techniques in character diagnosis.

Association tests are the characterological approaches most common in the United States. Meltzer (112) asked 132 students to describe the experiences of their Christmas vacation, and found the average student remembering eleven pleasant experiences and seven unpleasant ones. Six weeks later 60 per cent of the unpleasant and 43 per cent of the pleasant experiences had been forgotten. The individual differences in forgetting led him to classify his group into optimists, pessimists, and indifferentists. Estabrooks (39) made an important contribution to technique by showing that a suggestion of sex responses in advance of a free association appeared not markedly to increase the proportion of such associations. Good (54) used the number of words furnished by a patient in three minutes not only to show mental level but also to show repressions and, when the

words were classified as male, female, or neuter, to indicate the sex of the dominant parent. Noh and Guilford (**118**) asked 100 college men and women to write 100 words as rapidly as possible. When these words were classified, they indicated that the men used more verbs, more abstract forms, more words dealing with implements and occupations; whereas the women more often referred to words describing clothing, buildings, education, art, kinship, and music. There were no great differences in speed of writing or in per cent of unique associations. Kent and Wells (**81**) standardized story completion tests on over 400 children, emphasizing particularly the intellectual measure, but recognizing the possibility that such tests might reveal something of personality. Several studies of graphology were presented (**20, 30, 75**), the first one analyzing in particular the third-dimensional factor of pressure. Two studies (**48, 77**), demonstrated, as is usual, that character indices based on skull measurements and judgments of teaching ability based on photographs are worthless. Paterson (**122b**) summarized the matter in these words, "With the possible exception of physical factors associated with temperamental characteristics and of disease processes involving the higher centers of the central nervous system, our survey has demonstrated that prevalent notions regarding an intimate relation between bodily traits and mental development (personality included) have been greatly exaggerated."

IV. Physiological Indices

The psycho-galvanic reflex has claimed the lion's share of attention in this field. Thouless (**148**) presented careful experiments with methods designed to distinguish between the PGR and the phenomen of Tarchinoff, the latter being the change in current passing between two electrodes on the skin when no external electrical current is introduced. He is inclined to believe that these phenomena are physically distinct and independent, although both are usually combined in less careful determinations. Landis (**89**) and Wang (**156**) both reviewed previous studies and came to the conclusion that the psychogalvanic reflex is one of a complex of autonomic reflexes under the control of the sympathetic division and associated with such other changes as sweat secretion, vasomotor changes, and muscular responses. Both are inclined to doubt the wisdom of interpreting PGR changes as indicative of emotional reactions. Phenomena appear with or without conscious emotional

concomitants. Davis (32) showed that the size of the deflection depended upon the size of the measuring current, and found that the stronger stimulus gave a shorter latent period. Abel (1) found fifteen times as many PGR deviations in response to true-false problems which subjects reported as hard, as occurred with the presentation of easy problems. Patterson (124) found surprise one of the emotional states that might be accompanied by the reflex, but agreed with other studies in finding that the form of the reflex response did not indicate the nature of the feeling. Odegaard (120) found 344 psychiatric patients giving more unstable, irregular, and on the whole less active reflexes than were gvien by 182 normals. The more serious conditions showed more atypical reactions. Organic and schizophrenic psychoses showed large decreases in reactivity. Jones (78) applied the PGR to eight babies, three to eleven months of age, and found the curves showing the same characteristics that have been reported in adults. Startle and frustration were the most effective stimuli. Initial resistance was lower than with adults, and did not rise during sleep. There was suggestion that the children who were most active in emotional expression, who cried most easily, showed the least resistance on the galvanometer. Estabrooks (40) found that the body resistance of adults increased during hypnosis, as it has previously been reported to do during sleep. This response was rather quickly conditioned to the presence of the operator, and appeared without development of anything like the hypnotic trance.

Rackley (125) used both the psychogalvanic reflex and the blood pressure measures, discovering a low but positive relation between them. For his ten subjects, fear-producing stimuli caused larger changes than were produced by mental work. Evans (41) reported galvanic, heart and breathing changes but found no significant correlations with intelligence or academic grades. Body resistance showed a correlation of —.42 with intelligence among 50 college students. Scott (133) showed a motion picture to 100 men and recorded systolic blood pressure. Sex emotion aroused by a dancing girl brought about a rise in systolic pressure, but such stimuli as a flogging scene and the cataclysmic destruction of a city showed no characteristic response. Skaggs (135) found pulse rate least in the relaxed condition, increasing during the expectation of a shock, greatest following an unexpected loud noise. Breathing was most shallow during mental multiplication, increased in amplitude during relaxation, still further during anticipation of a shock, and was at

its peak in the relief following the shock. Furukawa (50) continued his studies on blood groups, using in this case self ratings on 11 temperamental characteristics. He is inclined to believe that persons of Blood Group O are phlegmatic; those of Blood Group A, melancholic; those of Blood Group B, sanguine.

V. Laboratory Tests

Duffy (37) demonstrated that there are interesting possibilities in the measurement of muscular tension in grip. Nursery school children held a bulb in one hand and used the other to make a discrimination reaction. The individual differences were constant during the eleven days of the study. A positive correlation existed between degree of tension and the teacher's estimate of tendency to excitability. Shape of the line and degree of variation from it appeared to be more significant than merely average tension. Andrews (5) studied imagination, again with nursery children. A tachistoscope presented partial stimuli to cause recall of past experiences. Number of suggestions and quality of imagination showed a high correlation (.87). There was little relationship between intelligence or chronological age and the amount of fantastic imagination. Previous studies have failed to show any relationship between laboratory tests and the ill-defined concept of introversion or extraversion. Washburn's (157) study of 42 college women is no exception. Reaction time, flicker sensitiveness, extremes of liking and disliking rather than indifference to color or nonsense syllables, showed the negligible differences that might have been expected. Hull (71) has standardized phonograph records for hypnosis in a way that may furnish an objective situation for measuring one form of suggestibility. Wollstein (168) presented a battery of 20 laboratory tests and recorded personality reactions which appeared during the testing of two individuals.

VI. Knowledge and Ability Tests

Social intelligence still calls forth some attention (18, 139). In agreement with previous investigators, Strang (139) found that correlations with other measures of general intelligence are more significant than correlations with success in being a dean of women, scores on the Gilliland Sociability Questionnaire, teaching experience, or other indices of social ability.

Association Press has published a Moral Information Test (160) covering knowledge of cause and effect in personal relations, proper identification of acts of cheating, lying, and stealing, and extent of ethical vocabulary; reliability about .80.

VII. Attitudes, Opinions, and Beliefs

Opinion Ballots A (160) and B (160) developed by the Character Education Inquiry record the judgment of children on what is their duty; on the best act in certain common situations; on acts which should be called right, excusable or wrong; the truth of ethical maxims; the probability and importance of consequences following certain common behaviors; feelings about school, choice of companions; typical interests, ideas of the justification for acts usually considered wrong; ideas of success; preference among activities, and so on. Reliability of Ballot A is .53 and its correlation with mental age .60. Reliability of Ballot B is .81 and its correlation with mental age .54.

Dudycha (34) gave to all freshmen entering Ripon College in 1929 a questionnaire including moral beliefs, among others. Ninety-five per cent believed that one should always pay his debts; 79 per cent that one should never make statements which are intentionally misleading; 76 per cent that it is wrong to have promiscuous sex relations; 70 per cent that it is wrong for women to use alcohol; 49 per cent that one should always obey his parents; 39 per cent that cribbing in an examination should be reported; 24 per cent that it is morally wrong for women to smoke, and 9 per cent that it is morally wrong for men to smoke.

Religious opinions and attitudes are recorded in the Test of Religious Thinking (160) which is available in an elementary and an advanced form, in five of Thurstone's scales (150) dealing with attitudes toward God, and again in the questionnaire used by Dudycha (35). This last named showed a reliability of .93 between statements presented in one form and the negative form, and showed Ripon College students accepting about 60 per cent of the orthodox doctrines.

Most of the attitude and opinion scales deal with social questions. Three parallel forms of the test for measuring ethical outlook upon economic questions have been prepared by Schultz (160). International attitudes are measured by Harper's three-hour test (160), the Test of Opinions on International Questions (160), Neumann's

test (**116**), and the Droba Scale of Attitudes Toward War (**33**). Race Attitudes are measured in the test of Race Attitudes (**160**), the Hinckley Scale for measuring Attitude toward the Negro (**69**), and in five attitude tests presented in Lasker's book (**91**) and which are published by The Inquiry, 129 East 52 Street, New York City. Willoughby (**164**) sampled student opinion at Stanford University and found about 99 per cent satisfaction with the college, 50 to 60 per cent favoring recognition of Russia, 20 to 40 per cent planning to enter business rather than a profession, 70 per cent of the men and 90 per cent of the women favoring a single moral standard, etc. There was no very clear influence of college experience upon such attitudes. Kornhauser (**83**) tested students before and after a course in economics, finding improvement unrelated to intelligence, but varying inversely with original score. Apparently the students became more scientific and more liberal in their answers. Lockhart (**101**) found that 3,500 children agreed with his ideas about law enforcement about as well as did adults. Blanchard and Manasses (**15**) kept up the Stanley Hall tradition by a book based upon 252 answers to questionnaires given adolescent girls and covering topics of sex adjustment, inferiority feeling, ideals, vocational plans, and so on. Thurstone (**149**) reported a scale for measuring attitude toward the movies. The University of Chicago Press lists (**150**), in addition to those already published, a scale of Attitude toward Birth Control, and 26 other scales planned or in preparation. Three studies (**34, 53, 102**) based on superstition among high school or college students indicated that the common expressions regarding luck are not often believed. Among the 200 statements submitted by Lundeen and Caldwell (**102**) to 900 high school students, the only statement believed by more than one-half of the group was that the winters are less severe than they used to be thirty or forty years ago. About one-third of the group concurred in the next most popular statements, which dealt with indication of a heavy winter by birds' plumage, extra supplies of honey, heavy coats of fur, or unusual accumulations of nuts by squirrels. In this as in previous studies girls are slightly more credulous than boys, persons from small towns more so than people from cities, high school students more so than college students; although Lundeen and Caldwell found no correlation between superstition and age.

Lentz (**96**) proposed an opinion test score to indicate conservation, acquiescence, and variability, with reliabilities of about .70.

Weinland (163) discussed the use of proverbs as a possible test for differentiating male and female attitudes, conformists and variants.

VIII. Interests

There are five commonly accepted methods of measuring interest. The most common and least valuable is probably some instrument which asks people what they are interested in. There is something of an improvement in the measures which get at interests indirectly through a series of likes and dislikes, the purport of which is not obvious to the person answering. Report by an individual of what he actually does is sometimes used as an indication of interest. The fourth type of measure is an information test based on the assumption that those who know most in a given area must have the most interest in it. Actual observation of the individual's behavior is the last and best measure. Each of these types was represented by some studies during 1930, and these will be presented in the reverse order from that suggested above.

Hulson (72) made detailed consecutive observations on ten four-year-old children half an hour on every school day throughout the year. Blocks were most often chosen, used for longest periods of time, and most apt to be used by several children. Sand table and house corner also stood high. Dolls, animals, and blackboards rank low on these measures. The average length of time spent on an activity varied in the case of different children from seven to twenty-seven minutes. Ehrle (38) observed 100 children two to seven years of age, and on the basis of their behavior classified their predominant values as sense-pleasure, egoism, economic, or social. About 20 per cent he found to be a pure type, strongly influenced by one value only. Waples (156) compared the reading interests of adults as marked on a questionnaire with actual reading, and found wide discrepancies. The questionnaire reports revealed interest differences along social, geographical and educational lines.

The only information test for measuring interests was described by McHale (107) as given to 133 Goucher College students. The test involved familiarity with such items as the Seguin form board, the findex system, pruning, the Hippocratic oath, and a codicil. Only 24 per cent were following two years later the vocation they chose while a college junior. Among those who had done so there was a correlation of about .7 between the test results and success as estimated on a five-step scale by the employer.

Time schedules may be used as interest measures, and were so used by Coy (**29**) in relation to thirty gifted children and by Andrews (**6**) with students at the North Carolina College for Women. Coy found no constant difference in time schedule between the bright and the extremely bright. Andrews found freshmen spending much more time on curricular than on extra-curricular life, but that for seniors the proportions were about even. Stoke and West (**138**) asked 36 observers to record on a check list topics which they heard discussed in free conversation among students. Sex and dates made up the largest category. The total percentage of topics classifiable as artistic or intellectual was only about 15 per cent; as impersonal social comment, one-tenth of 1 per cent. These observations led the authors to reflect sceptically about the value of the college dormitory bull session. Lehman and Witty (**92–94**) are still squeezing drops of juice from their play questionnaire. The studies published this year suggest that boys carry on more motor activities than do girls; that accelerated children read more than retarded children; that retarded children select more play activities of a religious nature; that pubescence is accompanied by loss of interest in childhood activities.

The most significant measure developed during the year in the field of interest is probably Garretson's questionnaire (**51**) for differentiating technical, commercial and academic inclinations of ninth-grade boys. Reliabilities for the scores were about .9, and bi-serial r's between the test and enrolment or non-enrolment of the pupil of above average success as indicated by school marks was .9 for the technical group, .7 for the commercial and .6 for academic. Correlations with objective measures of mechanical, clerical and academic ability were close to zero. Symonds (**145**) made the interesting point that these interest questionnaires show the type of curriculum into which the individual should go, whereas the objective tests of ability indicate the degree of success he will probably obtain in it. Langlie (**90**) confirmed the usual understanding that pupils are more apt to get their best grades in subjects they like best. The Strong Vocational Interest Test is being widely used and was discussed in two articles (**140, 141**), one of which presents the formula by which " like," " dislike," and " indifferent " were weighted to yield reliability coefficients between .75 and .90. Among Stanford University seniors two years after testing, 50 per cent were in occupations in which they had rated highest on the test, and 71 per

cent were in occupations in which they had rated first or second. A like-dislike test was used in the new Minnesota series of mechanical ability tests. Morris (113) described in an article, her dissertation, previously published, a test of likes, of knowledge of tactful response, of the best reaction to teaching situations, of feelings about such situations, etc., which correlated .46 with practice teaching grades when intelligence and academic averages were constant. Ullman (153) found teaching success closely related to grades in practice teaching and to socio-economic status, but little related to self-ratings, knowledge of objectives and principles of education, or teaching interests on the Strong blank.

An interest interview with a blank for guidance was used with a great deal of success in counseling by McFarland and Sonquist (105). Five studies (3, 79, 128, 143, 156) asked children or adults about their favorite books, work, recreation, companions, purchases, movie actress, type of moving picture, etc. Antipoff (8) compared results with investigators in other countries. Moving picture interest studies appeared consistent in reporting preference for mystery, comedies and active Western pictures. Interest in love themes increased with grade advancement among high school children.

IX. Self-description

Very intriguing devices are being developed to record with some subtlety the opinion which an individual holds of himself. Most of the instruments are dependent upon frank coöperation. Not all of the reports give adequate recognition to this fact. The validity of any self-report measure lies in the conditions under which it is used quite as truly as in the blank itself. Thus in the S-A Test (160) some 25 per cent of the pupils in an average grade school will report unwarranted virtues for themselves so numerous as to be beyond three S.D.'s from the mean of an honest group. Maller (108) reported that papers upon which children have signed their names show more coöperation for the class, and less tendency to give themselves desirable ratings. Flory (46) found a correlation of .5 between self-rating and average ratings by several friends on a scale of 25 traits related to teaching success.

In some of the tests the scoring has been disguised or complicated so that the subject can hardly distort his score by foresight of what will stand to his credit. Best of these, perhaps, is the (Sweet)

Personal Attitudes Test for Boys (160), which appears to be a three column checking of likes and dislikes, but which yields scores related to self-criticism, criticism of others, feelings of difference, sense of superiority, inferiority, social insight, and deviation from the group idea of the right. Reliabilities by split-half methods ranged from .76 to .94 for these scores. Most useful for personal counselling is the Rogest Test for Diagnosis of Emotional Maladjustment in Children Nine to Twelve (160), yielding diagnostic scores for personal inferiority, social inferiority, family relationship problems, and day-dreaming. The Burdick Apperception Test (160) is offered as a measure of cultural background in the home, well validated in the course of the studies made by the Character Education Inquiry. It is related to the Sims Score Card (r=.51) to occupational status (r=.48), to intelligence (r=.48) and especially to home ratings by case visitors (r=.66).

Faterson (45) reported a scale of 94 self-rating items for measuring inferiority attitude, with a reliability among college students after six weeks of .73. Women showed more inferiority feeling than men (5 P.E. diff.), men in education or dentistry showed more than men in business or engineering, women in music or medicine showed more than women in home economics or nursing. A "worries scale" containing many of the same items in a different form showed a correlation of about .5 with inferiority feeling. Inferiority showed a correlation of about the same magnitude with the Woodworth Personal Data Sheet, and of about .3 with the Heidbreder Introversion Scale. In the same study an interest test was created having a reliability of .6 or .7 and a correlation with the inferiority measure when applied to a new group of .4. Correlation of inferiority feeling with intelligence and college marks was negligible although the children of semi-skilled and unskilled laborers indicated much more inferiority feeling than did the children of the managerial group.

Watson (158) found that self-estimates of happiness were consistently reported (r, split halves, .84) by graduate students and as a result of that study and another by Sailer, still unpublished, a revised test for recording happiness rating is now available (160). The original study showed happiness bearing no relation to intelligence or academic achievements, but significant relationship to sex adjustment, self-confidence, absence of sensitiveness, superior health, satisfaction with work, etc. Fairchild (42–43) estimated from case-

interviews the happines of men in the metal trades and found correlations of .5 or .6 with skill measures, skill appearing more significant than wages or hours in bringing satisfaction. Hall (59) likewise measured job-satisfaction, this study being in terms of reaction to the disagreeable features of the work. Cason's Annoyance Test (24) gives a record of the proportion experiences found irritating.

Thurstone's Personality Scale (151) is made up of 223 questions compiled from previous lists used by Woodworth, Laird, Freyd and Allport.* Reliability is reported as .95. On every question more of the most neurotic 7 per cent responded unfavorably than so responded among the least neurotic 7 per cent, the extreme groups having been selected by total scores. Women showed 44 symptoms to the average man's 37. Slightly more symptoms were reported by non-fraternity than by fraternity students, more by Jews than by Gentiles, more by good than by poor mark-getters, although correlation with intelligence was .04. Heidbreder published a Personal Traits Rating Scale (64) and a study (65) showing general agreement between traits approved for self and for others. Sex differences pointed to women being more apt to prefer introversion, and to recognize inferiority feeling in themselves. Richmond's Psychotic Questionnaire is published (127). Weber (161) discusses an emotional age scale correlation .4 with M.A. and .5 with C.A. Watson (159) offers an unstandardized scale for rating and diagnosing home discipline. Leonard (97) reports a questionnaire with over 800 responses from girls dealing with what they tell their mothers.

Symonds (144–146) with Jackson (146) made an inclusive approach to the discovery of maladjusted pupils, using an autobiography, a group intelligence test, a questionnaire of 175 yes-no items covering the pupil's own attitudes toward school-work, teachers, pupils, home, personal affairs, etc., an identification sheet of the "Guess Who" type filled out by fellow pupils, and a reputation sheet for teachers' ratings. Failure in marks continued to surpass any of these as indicative of the pupils considered by teachers to be problems. The pupil's own report correlated (biserial) .38 with being a problem, his

* The Bernreuter Personality Schedule published by Stanford University Press combines a measure of neurotic traits, a measure of introversion, of ascendance, and a new phase called "adequacy" in one instrument. This useful instrument for replacing the separate scales like the Thurstone, Allport, Colgate, etc., was not published until 1931 and strictly speaking belongs to next year's review.

fellow-pupils' reports gave a similar result (r=.31). The most maladjusted pupils were those who reported themselves as discriminated against in class, wanting more electives, disliking subjects, disliking teachers, burdened with too much home work, disliking examinations, etc., and who were reported by fellow pupils as grimacing, day dreaming, never volunteering, bullying, pushing, making fun of others, etc. The questionnaire presumably catches the seclusive, withdrawing type, the rating scale the boisterous attention-getting type. Keys and Whiteside (**82**) averaged Woodworth-Cady symptom score and teacher's rating on emotional instability (the correlation between the two measures being .53) and found the extreme groups differing in that the stable pupils were seven months younger, 18 points higher in I.Q., two years ahead in mental age and educational age. A.Q.'s were 100 for each group. Asher and Haven (**9**) compared 594 public school boys with 249 boys of similar age, twelve to eighteen, in the Kentucky Houses of Reform. No significant differences appeared in total scores although the delinquents were more apt to report a strong desire to steal, a desire to run away from home, need for a light in the room at night, truancy, and fear of thunder-storms. The list is very nearly the same as that obtained by Slawson some years ago. Evans (**41**), Gilliland (**52**), and McGeoch (**106**) add to the evidence that quantitative scores on emotionality tests have very little significance for school success. Beckman and Levine (**12**) found the Ascendancy-Submission Scale and a directions test of some merit in distinguishing between meter readers and city manager executives, but introversion (Colgate variety) was irrelevant. Extraversion (Neymann-Kohlstedt variety, **117**) was characteristic of the bed-ridden group.

X. Reputation

Hartshorne and May discussed new devices for rating character (**110**) and mentioned particularly the Guess Who Test (**160**) on which pupils in a class rate each other, the Check List (**160**) which gives surprisingly good results with merely a list of adjectives upon which the teacher checks those applying to the child, the Conduct Record (**160**), a blank for recording the extent to which a child does approved things, and the Portrait Matching Scale (**160**), a device suggesting ten verbal portraits of children ranging from most to least unselfish, to be used as is the Guess Who Test. The

Haggerty-Olson-Wickman behavior rating schedules (58) are now published, as is Olson's monograph (122) on the development and use of the scales. The Merrill-Palmer standards of physical and mental growth (165) include percentile norms for nursery school children rated on energy, mental effectiveness, emotional control, ease of social adjustment, etc. The Seattle public schools (134) devised a report card in which the A, B, C, D, and E pupils were carefully described to make in effect, a portrait matching scale. Adams (2) presented a clear-cut method for determining how objective or subjective any scale may be. In perfectly objective scales, consistency among different persons is the same as consistency when the same person repeats his observations. In proportion as the self-consistency becomes greater than group-consistency the scale becomes subjective, *i.e.*, constant errors appear that are related to the judge. This ratio appears worth reporting on any type of measurement in which the suspicion of subjectivity enters. It is discussed here under reputation measures but would be as truly applicable to laboratory or behavior observation tests. It may prove as useful as reliability figures.

Reputation measures have been used by Turney (152) to discover personality traits related to superior achievement (higher than I.Q. would suggest) with the usual results: achievers are more punctual, more regular, in attendance, rated higher (by the same teachers who mark them), in industry, perseverance, dependability, ambition and interest in school work. In other words, they are successful in the eyes of the teacher. Herriott (67) evinces his faith in statistics by using tenth-order partial correlations to determine that the instructor's ratings on perseverance and evaluating attitude are more closely related to marks in education than are ratings on cheerfulness. Ratings of teachers by pupils are reported by Boardman (16), Clem (25), and Light (100). In the last-named study the best of 28 teachers was ranked first or second by 81 per cent of the pupils mentioning him, while the poorest was so ranked by less than 10 per cent. Boardman found that ratings on teaching efficiency, liking for the teacher, ability to make pupils work hard, ability to discipline, and amount pupils learn, all measured essentially the same attitude. He found agreement between ratings given by pupils, by supervisors, and by fellow-teachers in the neighborhood of .6 for each intercorrelation.

XI. Combinations and Batteries

Hartshorne and May, with Shuttleworth, published during 1930 the third and final volume of the work of the Character Education Inquiry, Studies in the Organization of Character (61). The first part of the volume presents the moral knowledge and opinion tests mentioned above, shows their intercorrelations to be close to .65, reviews some evidence previously published in the monograph "Testing the Knowledge of Right and Wrong," describes Patterson's "Foresight of Consequences" test, shows relation of moral knowledge scores to school marks to be about .4, to intelligence .6, to emotional stability .3, to honest conduct .39, persistent conduct .24, helpful conduct .20 and inhibited or controlled conduct .15. No comparisons were available between knowledge about specific forms of behavior and performance of those behaviors. All comparisons were statistical and in terms of total scores. Relation between all knowledge and all conduct tests is shown in Part II to be .12 in one population if scores be deviations from class means, or .55 if deviations are measured from the mean of the population tested, or .84 if class means are correlated, illustrating the dependence of the relationship upon factors common to the group but not similarly related in individuals. Intercorrelation among tests is shown to increase regularly from .00 if specific tests are used and scores represented in deviations from the class mean, as broader combinations of tests are used and classroom means are correlated, reaching .60 for the intercorrelations of class means in all three populations on traits made up of many single tests. The average interrelationship within a trait and the intercorrelation of traits are about equal, (r=.2) suggesting very little value for the trait unit in measuring character. Part III, brings together all the available tests into composite portraits, judged for all-round character value by 63 judges. On this basis total character is best predicted from the conduct record (160) (r=.72), next best from the check list (160) (r=.66) both of them reputation measures. Other measures correlating above .5 with total character thus judged were scholastic marks, deportment marks, the Guess Who Test, Opinion Ballot A combined with Opinion Ballot B, and total service score. Chronological age (—.07) and the Sims Score Card for Socio-Economic Status (r=.14) were least related. This extraordinary preference for reputation measures probably reflects the fact that the most vivid items in the portraits were not the conduct scores, statistically expressed, but the adjectives

used by teachers and pupils in their reports. Part IV discusses "integration," using the term in a special sense to mean consistency or absence of variability in scores on different measures. A pupil who was poor in one measure was required to be equally poor in all others to be "well integrated" as the term is here used. The contributions made to the theory of character are summarized in concluding chapters, also in two articles (**62, 63**). These summaries stress: the theory of specificity; the lack of relation between knowledge and conduct; the significance of group morale; the lack of character significance in age, sex, and health; the correlation of about .6 between character and intelligence; the resemblance of siblings (r=.5); the impotence of most character building programs; the close relationships among friends (r=.7); the importance of a unified and integrated environment.

Hightower (**68**) working with Starbuck, tested from 300 to 3,000 pupils using a Biblical Knowledge Test and most of the honesty and service tests of the Character Education Inquiry. Correlations of Biblical knowledge with conduct were uniformly zero, correlations with teachers' ratings occasionally went up to .2 or .3. Delinquents surpassed public school pupils of similar grade in the Bible knowledge tests. On the conduct tests the delinquents were superior in one comparison, the public school pupils in three, and in four cases the difference was not significant. Howells (**70**) found those more conservative in religious outlook to be less intelligent, more suggestible and less willing to stand pain in laboratory tests.

Terman (**22**), Witty (**166**) and Lamson (**88**) applied some character measures to intellectually gifted pupils. Gifted pupils cheat less, read more, are elected to more offices, are more apt to choose professions, report fewer neurotic symptoms, have normally versatile play interests, are less masculine in interest (if boys) or less feminine (if girls), are slightly above average in fairmindedness, are rated by teachers as well-behaved, persistent, popular, not considered queer or conceited or abnormal. About 25 per cent appeared to have mild personality problems, 5 per cent to have serious problems. In general girls are rated slightly better than boys, as in all reputation studies. Of special interest are the correlations over five years reported by Terman. For the Wyman Interest Test these were .31, .37 and .15, corresponding to .81, .74 and .61 over ten days. For the Woodworth-Cady Blank reliability was .42 over five years, but .75 of a week or two.

Vetter applied a battery of tests in the study of social attitudes (154). He found conservatives more apt to be women, prosperous, youngest children, republicans, Gentiles, and below the radicals in intelligence. Three studies (27, 56, 74), fail to demonstrate differences between negroes and whites in suggestibility, ascendance, or emotional association complexes. Oliver (121) compared extreme introverts and extraverts on the Colgate test, finding no relation to age, intelligence, ascendance, prejudice, social intelligence, but some difference in scholarship, emotional traits, likes and dislikes. Bellingrath (13) compared high school leaders in extra-curricular life with non-leaders, found boy leaders more apt to be rated as interested in continuing study, girl leaders rated as superior in neatness, honesty, interest, initiative, ambition, persistence, reliability, and stability. Correlation of leadership with intelligence was —.14; with scholarship, school habit rating, socio-economic status and introversion the relationships were all zero. Jersild (76) reported intercorrelations among 42 college students on tests of intelligence, social intelligence, emotional symptoms, ascendance, and ratings on ascendance, beauty and amiability. Allport test and rating on ascendance agree to the extent of a correlation of .5, beauty and amiability are similarly related, general and social intelligence give a correlation of .4, while the other relationships are considerably lower. Berne (14) combined diary observations, rating scales, and ten experimental behavior situations involving obedience, coöperation, property rights, etc. Few of the correlations with CA (MA constant) or MA (CA constant) were high. Interest in the group, independence, rivalry, socially controlled behavior, responsibility, affection, and ascendance showed correlations with MA above .4. Correlation between experimental situation tests and conduct ratings on the traits involved averaged .76. Kovarsky (84) discusses the value of the psychological profile (Rossolimo's) including tests of will and emotion.

XII. Selective Resumé

The outstanding event of the year has been the completion of the series of studies by Hartshorne and May with the interrelationships they present. The publication of their tests is noteworthy. The publication of the series of attitude scales following Thurstone's technique is an outstanding contribution. Adams' objectivity index has splendid possibilities in improving test technique. Several new

measures of inferiority feeling, of happiness and satisfaction, of the presence and nature of problems in emotional adjustment point to a very strong present interest. The trend in Germany toward the analysis of individual types, manifested in imagination, association, speech, and in motor habits, is in marked contrast with the mass testing in the United States. Behavior observation is achieving splendid results in nursery schools but has hardly entered other fields. The pioneer tests: Pressey, Downey, etc., have practically disappeared from the current studies. Introversion-extraversion is slipping rapidly into disrepute. The psychogalvanic reflex remains an interesting phenomenon but is less confidently connected with emotion. There are new inventions, like the Guess Who technique, in the field of reputation measures and a greatly increased confidence in the significance of reputation. There seems possibly to be an over-use of cross-sectional studies with correlational techniques and a paucity of experimental before-and-after studies. The amount of first class psychological study being given to character and personality is showing healthy increase.

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REPORT OF THE TREASURER

American Psychological Association, Incorporated

For the Period from December 15, 1930, to December 15, 1931

Receipts

Balance, December 15, 1930		$9,962.09
Dues of Members and Associates	$11,322.75	
Sale of Monographs	12.57	
Sale of Yearbooks	2.50	
Sale of Programs	55.00	
Interest:		
On checking account	$79.51	
On savings account	302.40	
	381.91	
		11,774.73
		$21,736.82

Disbursements

Printing and Supplies	$766.44	
Postage and Express	252.70	
Telephone and Telegraph	11.99	
Reprints	234.90	
Yearbooks	564.87	
Proceedings (abstracts)	141.43	
Treasurer's Bond and Safety Deposit Box	31.00	
Committee on Animal Precaution	11.00	
Certification Reimbursement	35.00	
Secretary's Stipend	1,407.00	
Treasurer's Stipend	275.00	
Incidentals, 1931 Meeting	320.04	
Lawyer's Fee	15.00	
Subscriptions to Psychological Abstracts	4,542.00	
Exchange on Checks	7.31	
		$8,615.68
Balance on hand, December 15, 1931:		
On checking account	$3,818.74	
On savings account	9,302.40	
		13,121.14
		$21,736.82

ACCOUNT OF NINTH INTERNATIONAL CONGRESS DEPOSITED WITH AMERICAN PSYCHOLOGICAL ASSOCIATION:

On hand, December 15, 1930	$2,216.49	
Interest	87.76	
		$2,304.25

LEONARD CARMICHAEL,
Treasurer.

Audited and found correct by
CARROLL C. PRATT.
MICHAEL J. ZIGLER.

Date: December 19, 1931.

BOOKS RECEIVED

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NOTES AND NEWS

ACCORDING TO SCIENCE—In the winter and spring Professor Thomas R. Garth, of the department of psychology at the University of Denver, has engaged to give a lecture on "Race Psychology" at various institutions in the Middle West and in the East. His itinerary will include the University of Iowa, Wellesley College, Smith College, the New School of Social Science, New York City, Davidson College, North Carolina, and Washington University, St. Louis.

Education and Changing Society is to be the theme of the Sixth World Conference of the New Education Fellowship which will be held in Nice, France, next summer. The dates are July 29 to August 12, 1932. Further information may be obtained from Frances Fenton Park, secretary, 425 West 123rd Street, New York City.

THE Tenth International Congress of Psychology will be held in Copenhagen from the 22nd to the 27th of August. Reservations may be made with the American Express Company. Tours to psychological institutions in neighboring countries have been planned.